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MALFORMATIONS

OF THE

GENITAL ORGANS OF WOMAN

BY

CH. DEBIERRE

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With Eighty-five Illustrations

Translated by

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TRANSLATOR'S PREFACE.

This translation has been made with the consent of the author, and in order to fill a void in English medical literature; also, with the author, we add in the hope of instructing and interesting the reader.

J. Henry C. Simes.

Philadelphia.

AUTHOR'S PREFACE.

"All physical science depends essentially upon two facts: the particular facts, which are revealed by observation; the general facts, which are discovered by reasoning. Together they increase and mutually animate all studies. Considered separately, the first is only sterile material, the second only useless hypotheses. Science cannot exist with one or the other—it must have both—any more than reasoning can exist without premises or without consequences."

Thus begins Isidore Geoffroy Saint-Hilaire in the preface to his *Histoire des Anomalies de l'organisation*, stating, at once, that to the study of anomalies, considered in their special conditions, he will add the laws and general relations to which are brought all the particular facts. For as these laws and these relations are themselves only corollary of more general laws of the organization, it follows that the anatomical and physiological laws apply to *Teratology*, or history of anomalies of the animal organism, as well as to the normal morphology.

Again: "As teratology in the thousand and thousand facts which belong to it includes all conditions of the organization in all beings, it will be seen that there is not any general fact, any anatomical or physiological law, that it is not able to illuminate with a bright light, and to which it does not give positive and vivid confutation or confirmation. Therefore, such will be the ultimate consequence of an exact and deep knowledge of anomalies; the study of normal and teratological facts, both intimately associated, so that they are a mutual and powerful aid one to the other."

If these words of Isidore Geoffroy Saint-Hilaire are applicable to malformations, I will not say that they are especially suitable to malformations which affect the genital system of woman, but I do not hesitate to say that, in these cases, they are, perhaps, confirmed with more vividness. Teratology is a new science, which began in the eighteenth century, previous to which existed the fabulous period, during which monsters were considered as objects of terror, as prodigies destined to display the glory or the anger of God, or as prophetic beings begotten by the devil.

The anatomists of the first half of the eighteenth century were given to investigations upon monsters, not from a true scientific spirit, but from a curiosity and a desire for novelty, which is so natural to man.

It was not until the end of the eighteenth century, but more especially in the nineteenth century, that the ridiculous superstitions disappeared from the domain of teratology. To accomplish this it was necessary that the anatomy of Bichat and of Schwann should have its origin, that the embryology of G. Fr. Wolff should see the light, before teratology could become a true science—the science of anomalies of the organization. Without general and comparative anatomy and without embryology, philosophical anatomy could not have been created, and without the last, there never could exist the *theory of the arrest and perversion of development*, which explains the majority of malformations.

To-day we know that monstrosities are always the result of the action of accidental causes, causes which do not modify the whole organization, according to Dareste, but which modify it during the development of the organization, in giving a different direction to the phenomena of evolution. Isidore Geoffroy Saint-Hilaire, contrary to the views of Meckel, has demonstrated the possibility of modifying, by the action of external physical causes, the evolution of a fecundated germ, and, again, he has

proved that all malformations, from the slightest to the most serious, are essentially phenomena of the same order, that is, deviations of the normal specific type, caused by a change in the embryonic or fœtal evolution.

These general ideas of anomalies, we purpose to apply to the study of *Malformations of the Genital Organs of Woman.*

If we have undertaken to write a new history on this subject, it is that besides the great attraction, the great curiosity which belongs to it, there is also a scientific and practical interest of the first order, which we have endeavored to place in evidence upon every page.

It will be for the reader to say, if we have accomplished the twofold end we sought to reach: to interest, to instruct.

CH. DEBIERRE.

LILLE.

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MALFORMATIONS OF THE GENITAL ORGANS OF WOMAN.

CHAPTER I.

ANATOMY OF THE GENITAL ORGANS.

The genital system of women consists: (1st) Of two glands, which produce the eggs, the *ovaries;* (2d) of two ducts, which carry the eggs in their physiological migration, the *Fallopian tubes*, or *oviducts;* (3d) of a reservoir or chamber of incubation and of expulsion of the impregnant egg, the *uterus* or *womb;* (4th) of a copulating canal or expulsion canal of the product of conception, the *vagina;* (5th) of a region of sexual sensibility, the *vulva.*

The genital system, both in man and woman, is closely connected anatomically with the urinary system, although the functions of each of these two great organic systems are so different. Several of their constituent parts have for their origin the same embryonic outline, or are even transformed one into the other. Thus, the canal of the primitive kidney of the embryo becomes the spermatic duct or vas-deferens of the adult male. In some places the systems are in intimate contact, the prostate with the urethra in the male; the urethra with the vagina in the female. At other parts they are almost the same, as the penile portion of the urethral canal in man, which serves for the passage of both the urine and spermatic

fluid. If with woman the two systems are distinct in their course, it is no less true, however, that the terminal ducts, the urethra and vagina, both open into a common vestibule, the vulva, which is only the uro-genital sinus of the embryo. Some of the blood-vessels and nerves have conjointly the same origin.

These morphological connections between the urinary and genital systems have led anatomists to unite the two systems under the name of "genito-urinary organs." The same connections influence the pathological lesions and diseases, also the anomalies and malformations.

It is difficult to give the anatomical description or the malformations of the genital organs without at the same time giving briefly the anatomy and the malformations of the urinary organs. However, it is our purpose to treat only of the malformations of the genital organs of woman.

FIRST ARTICLE.

THE OVARIES.

The ovary is a glandiform organ, which is to the organism of woman what the testicle is to the organism of man.

There are two ovaries placed symmetrically one on each side of the uterus; joined to the latter organ by a ligament, the utero-ovarian ligament, lying upon the lateral walls of the pelvic cavity.

1. Shape.—The shape of the ovary of woman is oval, somewhat flattened antero-posteriorly, like an almond.

The color of the ovary is whitish-gray.

The weight of the ovary is about ten grammes, according to Puech. The specific gravity is 1.051.

The long diameter of the ovary is about forty millimetres, its short diameter eighteen millimetres, and it is fourteen millimetres in thickness. These dimensions are those usually met with.

It is to be remembered that the size of the ovary varies with the individual, the age, and the physiological condition of the woman. Thus, during the menstrual period the ovary of woman is larger, also during violent sexual excitement. At these times it is not unusual to find the ovary double the size we have given above, which is the physiological average size.

With young girls, before puberty, the surface of the ovary is smooth; after the first menstruation the surface becomes irregular, due to the rupture of the ovule, which causes a stellated cicatrix. In old age the ovary is very much roughened—shagreened.

The ovary, in the adult woman, presents one or more small transparent vesicles, filled with fluid—the so-called *ovisacs*.

2. Connections.—The ovary is connected to the uterus by its internal extremity, and its external extremity is connected to the Fallopian tube by the pavilion of the oviduct or fimbriated extremity. The ovary lies free in the abdominal cavity, except at its inferior border, where it is connected to the broad ligament of the uterus, and at this point the vessels and nerves enter the gland—the *hilus*.

Formerly it was believed that the ovary was placed transversely; but in the normal state it lies almost vertical, with its free border turned outward.

The exact location and connections of the ovary are difficult to determine, owing to its frequent displacements.

The ovary is generally found lying against the wall of the pelvis, in a depression which separates the artery from the hypogastric vein, and which Krause has named the *ovarian fossa*. When the abdomen is opened, and the intestines are turned aside, the ovary is so completely surrounded by the fimbriated extremity of the Fallopian tube that it cannot be seen.

The ovary is held in position by several ligaments.

First and principally by a ligament which connects it to the uterus. This ligament, the *utero-ovarian ligament*, is a cord of smooth muscular fibres, measuring three to four millimetres in thickness and from thirty to thirty-five millimetres in length. Its distal end is connected to the internal extremity of the hilus of the ovary, and its proximate end is connected to the corresponding lateral border of the uterus, near its superior angle, where it is continuous with the muscular fibres of the posterior wall of this organ. Another ligament of muscular and vascular nature connects the ovary to the subperitoneal fascia of the lumbar region, the *posterior round ligament* or *lumbar ligament* of the ovary, which is connected to the hilus of the ovary.

Again, the ovary is situated in a fold of the broad ligament of the uterus, called the *posterior wing of the broad ligament*. This peritoneal wing completely surrounds the ovary, to which it is intimately attached, except at the hilus, where its two layers are separated to form the *mesovarium*, and permit the ovarian vessels and nerves to enter the gland.

Finally, the ligament of the *Fallopian tube*, or *tubo-ovarian ligament*, connects the external extremity of the ovary to a fringe of the pavilion of the Fallopian tube.

Notwithstanding all these means of fixation, the ovary is more or less movable. It is liable to be displaced by the pressure of neighboring organs. Thus, during pregnancy it follows the elevation of the uterus, reaching the epigastric region.

Later we will speak of the congenital and accidental displacements of the ovary.

3. Structure.—A section of the ovary shows that it consists of two parts, one central and the other cortical.

The *cortical substance* (ovigenous or parenchymatous layer) is externally limited, in the adult, by a fibrous layer, which has been compared to the tunica albuginea of the testicle (tunica albuginea of the ovary). This membrane is not present in young girls. It is formed by the thickening of the connective tissue at the periphery of the cortical layer. This layer, the cortical, is gray in color and of firm texture. It is the essential layer of the ovary, since in it are found the vesicles, named *ovisacs*, or *Graafian follicles*. The layer consists of connective tissue, in which are dispersed, here and there, the above-named vesicles, in various stages of development, and it forms around the central substance a shell or rind of about one millimetre in thickness. The Graafian follicles, the youngest of which are not visible to the naked eye, vary in size from a pea to a small cherry, when they have reached maturity. At this stage they

are seen projecting from the surface of the ovary, in the form of a transparent vesicle consisting:—

1. Of a fibrous envelope, *external tunic of the ovisac* (membrana propria), adherent to the tissue of the ovary and traversed by numerous blood-vessels.

2. Of a second envelope of epithelial nature, applied to the internal or deep surface of the preceding membrane, and consisting of several layers of cells, the *membrana granulosa*, or *epithelium of the ovisac.*

3. Of a transparent and viscid fluid, *liquor folliculi*, which fills the cavity of the ovisac. At a certain point the membrana granulosa presents a disk-like thickening; this is the *cumulus proligerus*, or *proligerous disk*, which incloses a special cell, the *ovulum*, or *ovarian egg.*

Scattered throughout the cortical layer are seen yellow corrugated, empty or full, points or cavities, frequently having blackish or black narrow borders. These are the *corpora lutea.* They are divided into the *corpora lutea of menstruation*, the evolution of which is relatively rapid (changing into the corpus luteum), and into the *corpora lutea of pregnancy*, the evolution of which is slower and takes four or five months for its completion. The corpora lutea are the result of the rupture of the ovisacs. They are the cicatrices in process of evolution, which finally become fibrous. The appearance of the corpus luteum is due to the absorption and progressive transformation of the effused blood, which takes place when the ovisac ruptures and the ovum is set free. The recent corpora lutea contain a blood-clot at their centre.

Finally, the cortical substance or surface of the ovary, except at the hilus, is covered with a cylindrical epithelium, the *ovarian epithelium*, which for a long time was wrongly considered to be the peritoneal epithelium of the adult, but which is really the remains of the germinal epithelium of the pleuro-peritoneal cavity of the embryo.

The *medullary layer* (central, vascular, or bulbous) is a reddish, soft, spongy mass, consisting chiefly of blood-vessels, and especially of veins, which are surrounded by connective tissue and unstriped muscular fibres. Towards the hilus, the veins anastomose to form a plexus, constituting a true cavernous tissue, to which has been given the name of *bulb of the ovary*.

4. Migration of the Ovary.—It is known that the testicle has its origin at the side of the spine, in the lumbar region, alongside of the kidney, and it is only at a somewhat advanced period of fœtal life that it gradually descends towards the inguinal canal, in order, finally, to enter the scrotum. The ovary, like the testicle, has its origin in the lumbar region of the vertebral column, and about the third month of intra-uterine life it begins its movement of descent, to which is given the name of *migration or descent of the ovary*.

Enveloped in a fold of the peritoneum, the *mesovarium*, the ovary changes from its location at the fourteenth week. Until this time its direction was vertical; now it becomes somewhat inclined, and begins its descent towards the iliac fossa, where it arrives about the twentieth week.

During the first years of life the ovary retains, without much change, this position, and, like the uterus, it remains in the abdominal cavity. The pelvic cavity, at this period of life, is so small that it cannot accommodate the organ.

In certain exceptional cases this position is retained during life. At other times, on the contrary, it takes an anomalous position, and descends into the inguinal canal.

These exceptional cases, in the descent of the ovary, will explain the displacements of this organ, when we come to describe the several hernias.

Like the descent of the testicle, the cause of the descent of the ovary resides in the phenomena of increased growth.

The *gubernaculum testis*, which arises from the inguinal liga-

ment in the Wolffian body, is represented, in the female, by the round ligament of the uterus and the utero-ovarian ligament. This ligament as it passes into the inguinal canal carries with it the peritoneum, to form the *vaginal diverticula*, or *canal of Nuck*, which has united with it a few fasciculi of the large abdominal muscles, and, later, in man, constitutes the cremaster muscle. The *relative* shortening of this inguino-genital ligament causes the descent of the ovary, as the *gubernaculum testis* effects the descent of the testicle.

The vascular supply, the origin, and the development of the ovary will be described later.

SECOND ARTICLE.

THE FALLOPIAN TUBES OF THE UTERUS.

The *uterine tube, Fallopian tube, oviduct*, is a canal which has been compared to a trumpet, hence its French name, *trompe utérine;* it connects the ovary to the uterus.

1. Shape.—The length of the Fallopian tube varies from twelve to fifteen centimetres, and it gradually increases in diameter from the uterus towards the ovary.

The Fallopian tubes are divided into two parts: an *interstitial* or *parietal* and a *free* or *abdominal.*

The interstitial part begins in the wall of the uterus, at its superior angle, and opens into the cavity of this organ by a small orifice, about two millimetres in diameter, called the *uterine orifice* of the Fallopian tube. The length of this part is about three centimetres, the thickness of the uterine wall. At times the ovum is accidentally developed in this part of the tube (interstitial pregnancy).

The *abdominal part* is divided into the *isthmus*, *ampulla*, and *pavilion* or *fimbriated extremity.*

The *isthmus*, or internal segment, is a rectilinear or slightly curved part, three to four centimetres in length, and three millimetres in thickness; firm to the touch, and having a lumen which permits the passage of a hog's bristle.

The *ampulla*, or intermediary segment, is curvilinear in shape, and has a flexuose course, in some cases even winding like a corkscrew, as easily seen in the fœtus or new-born child.

Its length is six to seven centimetres, and its diameter is seven millimetres; its lumen readily permits the passage of a grooved director, and in those cases where this part has the spiral form, it presents separate alveoli, which form semilunar crests, which recall, in a measure, the appearance of the seminal vesicles in man. It is at this part of the tube that cysts and abscesses are developed, constituting the lesions hydrosalpinx, hæmato-salpinx, and pyosalpinx.

The *pavilion, fimbriated extremity*, or *external extremity*, is a funnel-shaped opening, which has been compared to the end of a trumpet. This part is divided into denticulations or fringes, free in the abdominal cavity. When this portion is examined under water, it has the appearance of a corolla with one or more rows of petals.

There are generally twelve to fifteen of these fringes; one of them covers the tubo-ovarian ligament. This fringe, *ovarian fringe*, is arranged in grooves, but rarely reaches as far as the ovary.

The *tubo-ovarian ligament, fibro-muscular ligament*, serves to guide the application of the tube to the ovary, at the moment of the discharge of the ovum. If there exist any adhesions, uniting the pavilion to other organs, the ovulation, as it is well named by Gallard, is hindered, the egg cannot be received as it passes from the Graafian follicle.

At the bottom and at the centre of the tubular funnel there is seen a small orifice, one to two millimetres in diameter, the *abdominal orifice* of the Fallopian tube, the mucous membrane of which is continuous with the tubo-uterine canal and the serous membrane of the abdominal cavity, so that the peritoneal cavity is seen to communicate with the uterine cavity, and by the latter with the external air, through the medium of the vulvo-vaginal canal.

The lumen of the Fallopian tube is found, upon transverse section, to be thrown into distinct radiated folds.

2. Connections.—The exact relations between the fimbriated extremity of the Fallopian tube and the ovary have been differently described. The ovary is free, the tube is very movable, and they are connected only by a long ligament, which is imperfectly seen when the pavilion is drawn away from the ovary. The ovum, however, passes from the ovary into the oviduct. Is this accomplished by the coaptation of the pavilion to the ovary, the fringes of which, like the fingers of a hand or the claws of a bird, are applied to the ovary as to the surface of a ball? or, on the contrary, does the egg reach the pavilion of the Fallopian tube by passing along the groove of the tubo-ovarian fringe, when it is then carried along by a serous current? Whatever it may be, Rouget has well said that the anatomical disposition of the ovary and of the Fallopian tube, in woman, seems to have been foreseen by nature, with a malthusian end, in order to limit to the minimum the chances of fecundation.

The *tubo-ovarian ligament* unites the ovary and tube; it is slightly attached to the ovary, and passes to the uterus, of which it is a tubular prolongation. This ligament is completely covered by the peritoneum, and lies in one of the folds of the broad ligament, the superior wing of this ligament.

The Fallopian tubes arise from the superior and lateral angles of the uterus and pass outwards towards the ovary.

3. Structure.—The Fallopian tube consists of three superimposed layers—a *mucous*, *muscular*, and *serous*.

The *mucous membrane* of the Fallopian tube is distinguished from that of the uterus, in that the latter, the uterus, is smooth and pink in color, while the former, the tubular, is pale and in folds. These folds form elevations, which are not obliterated by stretching. In the ampulla they anastomose one with the other, so as to form a honeycomb surface. The epithelium, which covers the free surface of this mucous membrane, is a

ciliated-columnar epithelium; its cilia move in a direction from the pavilion towards the uterus. A band of the peritoneum separates the ovary from the mucous membrane of the fringes. There are no glands in this mucous membrane, although it secretes an abundant mucous fluid.

The *muscular layer* of the Fallopian tube consists of two layers—an internal circular layer and an external longitudinal layer. The latter, by its fasciculi, constitutes the larger part of the tube, the *tubo-ovarian ligament.*

This layer occasions the peristaltic movement of the tube, which has a direction from the ovary towards the uterus,—the same direction as have the cilia of the mucous membrane,—the object of which is to carry the ovum into the uterus.

The *serous layer* of the Fallopian tube consists of the peritoneum, which forms the superior or middle wing of the broad ligament. This wing forms a long meso-salpinx, which envelops the tube and permits great mobility. Owing to this mobility, there is found a great variation in the position of the tube. Along the inferior border of the tube the two layers of the meso-salpinx are separated, in order to permit the entrance of the vessels and nerves into the wall of the organ.

Later will be described the origin and anomalies of the oviduct.

THIRD ARTICLE.

THE UTERUS.

The *uterus* or *womb* (Fig. 1) is a hollow organ, with thick and muscular walls, situated in the cavity of the pelvis, between the bladder and the rectum, destined to receive the fecundated

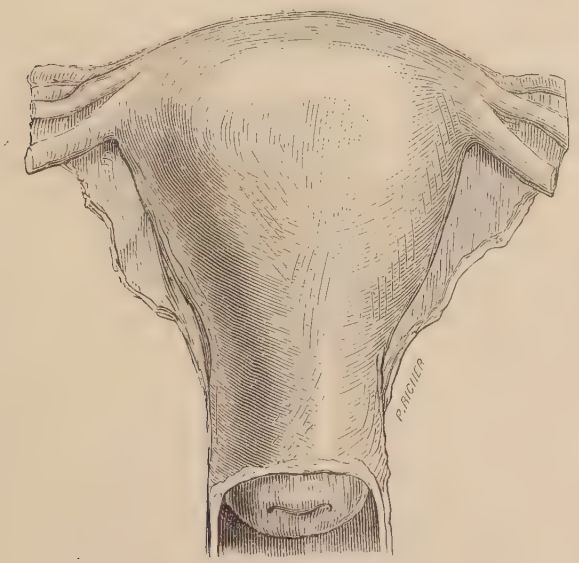

FIG. 1.—EXTERNAL SHAPE OF THE UTERUS IN THE NORMAL STATE.

egg, to afford it a proper shelter for its development during gestation, and, finally, to expel it when it has arrived at maturity.

1. **Shape.**—The shape of the uterus has been compared to that of a pear.

The uterus has two surfaces—an anterior, nearly flat; a posterior, convex. Its borders, which are lateral, are thick, divided into two layers, and serve as a hilus to the organ.

The *fundus* or *basis uteri* is thick and rounded; in women who have not borne children it is straight or even hollowed-out in the middle; while in those who have had children, it is convex. The apex projects into the vagina; it is circular and pierced by an orifice, *external orifice of the uterus.* In the nullipara this orifice is round; with women who have had children, it is a transverse opening. This gives to the apex of the uterus a form which resembles a fish's mouth, with two projecting lips, and it has received the name of *mouth of the uterus.*

A circular contraction divides the uterus into two halves, *isthmus of the uterus*—a superior, *the body;* an inferior, *the neck.* This hour-glass shape is, however, almost lost in women who have borne children.

The body includes the upper two-thirds or three-fourths of the uterus. The neck is divided into two parts, by the circular insertion of the vagina—a superior or supra-vaginal part, an inferior or vaginal part. The latter constitutes the mouth of the uterus.

The weight, size, thickness of the walls, and shape of the uterus vary, in the normal state, to a limited extent, according to the age of the woman; also during gestation; during menstruation, whether sexual connection has or has not been indulged in, and, finally, whether children have or have not been borne.

The average weight of the uterus is from forty to forty-five grammes, increasing to this weight as the woman advances in age, until the menopause; after which period it begins to lessen in volume. The uterus of a woman who has had children is

enlarged. The womb, during pregnancy, acquires a weight more than twenty times that which it had previous to the gestation (nine hundred to nine hundred and fifty grammes instead of forty-five grammes), and never again returns to its primitive size after parturition; it atrophies in virtue of a retrograde change, which tends to cause a return to its former size, but the atrophy is never to such an extent as not to show some evidence of hypertrophy, especially if a new pregnancy occurs, which arrests the retrograde change in process of evolution. If, however, a new pregnancy does not take place, the periodical and regular congestion of menstruation is sufficient to occasion this progressive hypertrophy, as is seen in young girls; that is to say, with age. With women who have had sexual connection, the connection, in its turn, determines congestion, less active, it is true, but its frequent repetition is not without effect, when added to the menstrual congestion, and this explains why the uterus of a defloured nullipara is always larger than the uterus of a virgin, but never so voluminous as that of a woman who has had children.

Several authors have published tables of measurements of the size of the uterus. The following, however, are given as those generally met with: The length of the uterus, in the defloured nullipara, is about six cubic centimetres; seven cubic centimetres in multiparæ, and in virgins it does not generally reach six cubic centimeters. The distance between the insertion of the two Fallopian tubes varies from thirty-eight to forty millimetres in virgins; from forty to forty-five millimetres in nulliparæ who have had sexual connection, and forty-five or more millimetres in multiparæ. The thickness of the uterus, in the virgin, measures twenty millimetres; in the multipara, twenty-five millimetres. The thickness of the walls of the uterus varies from about eight to twelve millimetres.

The *direction* of the uterus has occasioned much discussion; some describing its position as straight, others asserting that

it inclines forward (anteversion); and, again, there are others who say it has no fixed position. It may, however, be said that in the normal state the uterus is almost vertical, with a slight inclination forward—anteversion (fifteen to twenty degrees). Therefore, the uterus has its axis neither with that of the superior strait, nor with that of the pelvic cavity. In the normal state

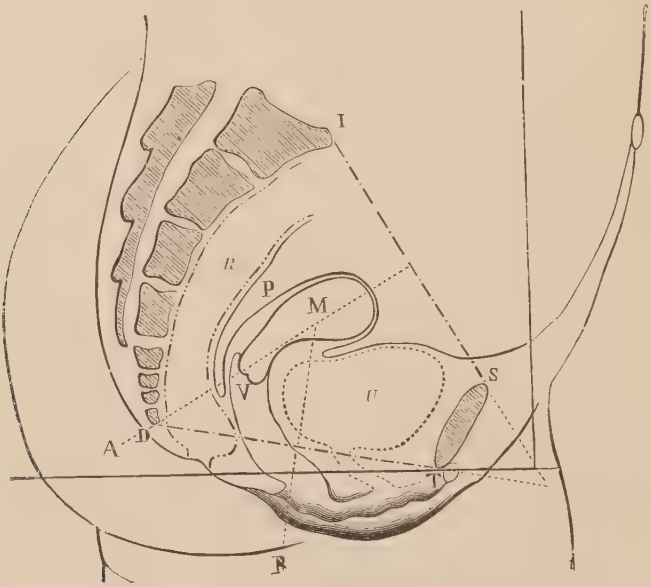

FIG. 2.—ANTERO-POSTERIOR SECTION OF THE PELVIS, SHOWING THE LOCATION AND DIRECTION OF THE UTERUS, ALSO ITS CONNECTIONS WITH THE NEIGHBORING ORGANS.

I, Promontory; *S*, pubis; *M*, uterus; *V*, vagina; *R*, rectum; *U*, bladder; *P*, peritoneal cavity.

this position of the uterus is, generally, but little influenced by the amount of distension of the bladder or of the rectum. Finally, the uterus is usually found a little inclined to the right or to the left (lateroversion). In regard to retroversion, it seems to be abnormal.

The uterus itself is not rectilinear; it is slightly arched for-

ward (anteflexed). With the vagina the uterus makes an obtuse angle, opening outwards (Fig. 2).

2. Connections.—The anterior surface of the body of the uterus is in relation to the bladder, but as this surface is covered with the peritoneum, which is reflected in order to cover the bladder, and also forms between the two organs the *vesico-uterine cul-de-sac*, in which are found some loops of intestines, the anterior surface of the uterus is not in immediate contact with the bladder. The neck and bas-fond of the bladder are connected by cellular tissue, which permits the two organs to slide one on the other. This contiguity explains the existence of utero-vesical fistulæ and the extension of inflammations and of malignant tumors.

The posterior surface of the uterus lies upon the rectum usually without any intervening loops of intestines. From this connection inflammations may extend from one organ to the other; also the examination may be made of the uterus by the rectum, etc. This surface is completely covered by the peritoneum, which is reflected to the rectum to form the *utero-rectal cul-de-sac*.

The lateral borders correspond to the insertion of the broad ligaments.

The *fundus* or *basis uteri* is free in the abdominal cavity, and, after puberty, it lies below the level of the superior strait of the pelvis. In the fœtus, on the contrary, the uterus is in the abdominal cavity, and gradually descends, in the young girl, into the pelvis.

The apex of the uterus is free and projects into the vagina.

3. Methods of Fixation.—The bands which retain and hold the uterus in its position in the pelvis are: the *broad or lateral ligaments;* the *round or anterior ligaments;* the *utero-sacral or posterior ligaments.*

Upon opening the abdominal cavity of a woman, and removing the intestines, the fundus of the uterus only is seen, not reaching above the pubis. It forms in the middle of the true pelvis a kind of transverse partition, completed on the sides by two peritoneal folds, which are named *broad ligaments* of the uterus. This partition divides the pelvis into two parts—one, the anterior, occupied by the bladder; the other, the posterior, containing the rectum. Above, these three organs are separated one from the other; below, they are joined one to the other. This union, however, does not extend to the apex of the uterus, which projects into the vagina. The uterus is, therefore, divided into two parts, one which projects into the abdominal cavity, the other into the vagina. The former is covered by the peritoneum, the latter by the vaginal mucous membrane. At the point where the peritoneum is reflected from the uterus, in order to pass to the neighboring organs, there is formed a gap; this gap is filled in with connective tissue, the *peri-uterine cellular tissue*, a very important tissue, which occupies the lateral borders of the uterus; it also surrounds the supra-vaginal or abdominal parts of the neck, and here forms a kind of ring, to which are attached all the uterine ligaments; so that Aran has called this zone of cellular tissue the *suspensory axis of the uterus.*

The *broad ligaments* are two large folds of the peritoneum, which extend transversely from the lateral borders of the uterus to the wall of the pelvis, and enclose between their folds a certain number of organs. Thus arranged, they form a kind of partition, which contains the uterus, and divides the pelvis into two compartments, quadrilateral in shape, which have been compared to the wings of a bat. The broad ligament is formed of two united peritoneal layers, one anterior, the other posterior, having a free or superior border, which floats in the abdominal cavity, and is subdivided into three smaller wings: the anterior portion contains the round ligament; the middle, which is the

more elevated of the three, encloses the Fallopian tube; the posterior contains the ovary and the utero-ovarian ligament. The inferior border corresponds to the pelvic aponeurosis (floor of the pelvis). At this part the two layers are separated from one another, in order to pass, one to the bladder, the other to the rectum; they contain, in a layer of connective cellular tissue, continuous with that which surrounds the neck, the utero-ovarian vessels and ureter.

Their external border separates, in order to be continuous with the parietal peritoneum of the pelvis. Their internal border also separates, in order to be attached to the corresponding lips of the uterus. Between the two layers of the broad ligament are found the uterine artery and the corresponding venous plexus.

The broad ligament, as stated, consists of two peritoneal layers, between which, in the cellular tissue, are found unstriated and striated muscular fibres, vessels, and nerves. At the meso-salpinx the peritoneum is very thin, and, at this point, Professor Renaut has called attention to the presence of a fibrous membrane, which has its inferior portion fenestrated. Above, on the contrary, it is strengthened by an irregular layer of smooth muscular fibres, which come from the borders of the uterus, being the superficial layer of this organ. This more or less developed muscular layer may be hypertrophied in some cases of prolapsus of the uterus. A case of this kind has been reported by Luschka. Beneath the doubled peritoneum is found a layer of adipose tissue, where are located the Fallopian tube, the anterior and posterior round ligaments of the uterus, also the uterine vessels and nerves. Towards the floor of the pelvis this cellular layer is thickened, and is continuous with the subperineal fascia, and with the cellular tissue, which surrounds the neck of the uterus. Boivin and Dugès have named this layer the *utero-subperitoneal tunic*, and Charpy calls it the *sheath of the vessels*.

It is in the space occupied by the base of the broad ligament, which is the seat of abscesses of this ligament.

The *round or anterior ligaments of the uterus* are two round cords, which have their origin from the superior angles and lateral borders of the uterus, below the origin of the Fallopian tubes, and extend to the inguinal canal, through which they pass, to be lost in the corresponding labium majorum and mons veneris. In their course through the pelvis they are placed in a fold of the peritoneum (anterior wing of the broad ligament). At the internal opening of the inguinal canal they pass around the corresponding epigastric artery, and adhere sufficiently to the peritoneum to cause it to form a funnel-shaped depression, when traction is made upon them. In the fœtus the peritoneum accompanies the round ligament into the inguinal canal, where it forms a small diverticulum, called the *canal of Nuck;* but to me this canal does not seem to be well marked.

Alexander's operation consists in a shortening of these ligaments, in order to bring forward a uterus which is retroflexed.

The round ligament of the uterus, for the greater part of the abdominal portion, consists of unstriated muscular fibres; these fibres are continuous with the superficial fibres of the uterus. In its inguinal portion are found some striated fibres, which come from the transverse and oblique muscles of the abdomen, and represent the cremaster muscle in man. At the central part of the cord is found some cellular tissue, in which run the funicular or cremaster artery and a plexus of veins, which extends from the utero-vaginal plexus to the epigastric and femoral veins. This plexus acquires a considerable size during pregnancy and also in some cases of varicose veins. There are also found some lymphatics and a branch of the genito-crural nerve.

The *utero-sacral or posterior ligaments of the uterus* extend from the supra-vaginal portion of the neck of the uterus, where they are continuous with the muscular fibres of this organ, to

the sides of the rectum, where they are comparatively few, and to the third sacral vertebra. Consisting of unstriated muscular fibres, these ligaments are arched or curved, and elevate the peritoneum into a more or less well-marked fold called the *semilunar or falciform fold of Douglas*. It is between Douglas's fold, on each side, the rectum behind, and the uterus in front, that the peritoneum descends in order to form the utero-rectal cul-de-sac or *cul-de-sac of Douglas*, which reaches as far as the vagina; an important anatomical construction to be remembered in surgery, and which is not present in the utero-vesical cul-de-sac.

Thus fixed by its ligaments, which fasten it to the walls of the pelvis, in direct contact with the other viscera of the abdominal cavity, the uterus, like the other abdominal organs, is subject to variations in position from pressure; but as soon as the pressure is removed, it returns to its normal position by the elasticity and tonicity of its ligaments. The broad ligaments, especially, are true suspensory ligaments, which may be readily demonstrated in studying these structures in quadrupeds.

There are attached to the broad ligaments two useless embryonic organs—the *hydatid of the Fallopian tube*, or *hydatid of Morgagni*, and the *organ of Rosenmüller*.

The *hydatid of Morgagni* is a vesicle suspended to a long slender pedicle, which is attached to one of the fringes of the pavilion or to the free border of the meso-salpinx.

The *organ of Rosenmüller* (parovarium) is situated between the two layers of the wing of the Fallopian tube, above the ovary. It consists of from fifteen to twenty canaliculi, which, like the teeth of a comb, are attached to a common duct, usually having a horizontal direction. Sometimes this common duct is prolonged along the sides of the uterus and vagina, when it is then called *Gärtner's canal*.

This latter condition is generally met with among certain adult animals, notably the cow, mare, and sow, where it is

seen to open into the vulva, at the side of the urinary meatus. The remains of this condition are found in about one-third of the women examined.

Rosenmüller's organ, which is analogous to the head of the epididymis in man, is the remains of the Wolffian body; its common canal is also the analogue of the vas-deferens of man.

FIG. 3.—ANTERO-POSTERIOR SECTION OF THE UTERUS.

va, Anterior wall of the vagina; *b*, *b*, region of the neck attached to the bas-fond of the bladder; *a*, anterior lip of the cervix; *p*, posterior lip of the cervix; *f*, posterior cul-de-sac of the neck; *i*, cavity of the uterus; *r*, utero-rectal cul-de-sac.

4. Cavity of the Uterus.—The uterus is channelled by a very narrow cavity, which in the nullipara, except during menstruation and gestation, is seen as a simple cleft, directed forwards (Fig. 3). In the body of the uterus this cavity is triangular in shape; in the nullipara, its sides are convex (Fig. 4); while, on the contrary, in the woman who has borne children, they are concave (Fig. 5).

The superior angles of the cavity of the uterus are funnel-shaped and present the mouths of the Fallopian tubes. These orifices are very small, and one scarcely understands Tyler Smith, when he advises their catheterization during life. This opening may be entered by a forced uterine injection, so that the fluid may enter the peritoneal cavity and give rise to a peritonitis. This is possible; however, Puech reports that in three hundred cases of menstrual retention, only in six was this orifice forced open.

At the inferior angle is situated the internal opening of the neck of the uterus.

The *cavity of the neck of the uterus*, in the nullipara, is as long or even longer than the body; while in the multipara, it is only about one-third as long as the uterine cavity. The neck is fusiform in shape, a little flattened in front and behind, so that there is described an anterior and a posterior wall; upon each is seen a vertical projection, which runs its entire length,

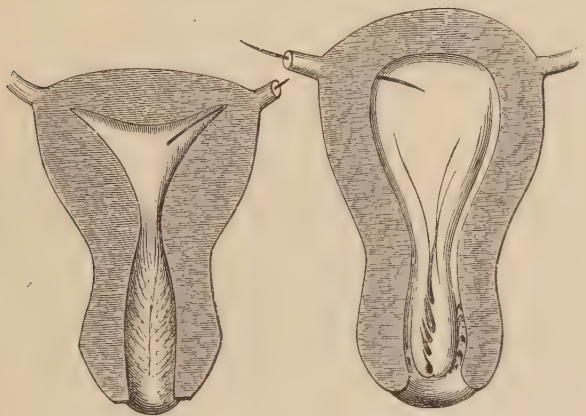

FIG. 4. FIG. 5.

FIG. 4.—LATERAL SECTION OF A NULLIPAROUS UTERUS. FIG. 5.—LATERAL SECTION OF A PAROUS UTERUS.

in the form of a column. From each of these columns there pass to the right and left projecting elevations, which are not superimposed, but interlace one with the other, in order better to close the cavity. These palm-like columns are named *arbor vitæ*—fern leaves of the uterine neck.

The cavity of the neck of the uterus, in the nullipara, opens into the uterus by a very small orifice; in the multipara it is much larger. This *internal orifice*, or *ostium uteri*, which is less an opening than a slit, measures about five to six milli-

metres. It corresponds to the isthmus of the uterus. In order to pass a sound, in a nullipara, through this orifice into the uterus, some skill is required. Felix Guyon has observed that in old women this orifice is obliterated.

The lower extremity of the neck of the uterus opens into the vagina by an orifice, the *external* or *vaginal orifice of the neck*. This opening, in the virgin or nullipara, is narrow and circular, or a regular and smooth transverse orifice (Fig. 6); in the multipara, it has the shape of an irregular gaping orifice, fissured at several points (Fig. 7). These fissures are cicatrices, and result, usually, but not always, from tears occurring during labor, which is important to remember in medico-legal cases.

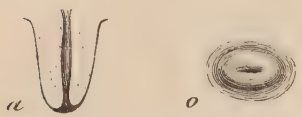

FIG. 6.—*o*, EXTERNAL ORIFICE OF THE NECK OF THE UTERUS IN A NULLIPARA. *a*, ANTERO-POSTERIOR SECTION OF SAME.

FIG. 7.—*o'*, EXTERNAL ORIFICE OF THE NECK OF THE UTERUS IN A WOMAN WHO HAS BORNE CHILDREN. *b*, ANTERO-POSTERIOR SECTION OF SAME.

The uterine cavity, in the nullipara, will hold four cubic centimetres of fluid, and, in the multipara, five to six cubic centimetres; its length, in the former, is about five centimetres, at times reaching even seven centimetres, and, in the multipara, six to eight centimetres; its width equals nearly one-half its length.

5. Structure.—The uterus consists of three tunics: an external, serous layer, formed from the peritoneum; a middle layer of muscular nature; and an internal or mucous layer.

The *peritoneal* or *serous tunic* covers the anterior portion of the body, the fundus, and the entire posterior surface of the

uterus. Anteriorly the neck is devoid of peritoneal covering; posteriorly it is covered by the peritoneum, which extends as far as the vagina and is reflected upon the rectum. At the neck of the uterus the serous layer is not intimately connected to the uterus, but has interposed a cellular tissue (paracervical cellular tissue), which permits the organ to slide upon its peritoneal surface, and which explains why tears or the amputation of the neck do not, generally, open the peritoneal cavity.

The *muscular tunic* consists of three layers: (1) An external layer of irregular, longitudinal fibres, which are continuous laterally with the fibres of the ovarian ligament, the round ligament, the utero-sacral ligament, and the muscular layer of the broad ligament. Upon the gravid uterus there is very distinctly seen a median band. (2) A middle layer of circular fibres, remarkable for the rings which it forms, around the openings of the Fallopian tubes, and internal orifice of the neck (sphincter of the isthmus), and for the large veins which traverse it (uterine venous sinuses). (3) An internal layer of longitudinal fibres, which are interposed between the cul-de-sacs of the glands, and form elevations, constituitng the arbor vitæ.

The *mucous tunic* is different in the body from that in the neck. In the body it is smooth, and pink in color, except during menstruation; at which period it is red and irregularly swollen to three times its normal thickness and punctated with hæmorrhagic points. During gestation this membrane becomes the *deciduous membrane*, which is thrown off, and again restored after labor. The epithelium of the mucous membrane is cylindrical in form, ciliated only during the active genital period (from puberty to the menopause). Numerous tubular glands are present in the mucous layer, and extend into the muscular layer.

The mucous membrane of the neck is thicker and lighter in color than that of the body of the uterus, and does not change

during menstruation or pregnancy. It is covered with an epithelium analogous to that of the mucous membrane of the body in the supra-vaginal portion of the neck; but in the vaginal portion the epithelium changes from a stratified cylindrical epithelium to a stratified pavement epithelium, resembling that of the vagina. In the grooves of the arbor vitæ open numerous glands, which secrete a thick mucus, and which may be transformed into cysts by the occlusion of their mouths, forming small pearly tumors, which Naboth, in 1694, mistook for eggs (*eggs of Naboth*). The mucous membrane which covers the mouth of the uterus is the same as that which covers the vagina.

The vessels and nerves, also the embryonic origin and development of the uterus, will be described later.

FOURTH ARTICLE.

THE VAGINA.

The vagina is a musculo-membranous passage which connects the neck of the uterus with the vulva. It is the copulating pouch.

Above, the vagina is attached to the uterus; below, to the perineum. Its direction is upwards and backwards, about fifteen degrees; consequently, when a woman is in the upright position, its direction is vertical; and when she is lying, it is horizontal. However, in some women the vagina has a more backward inclination, reaching about thirty degrees. In these cases the symphysis pubis has an inclination of about forty-five degrees from the vertical; while in the other cases it may incline nearly seventy degrees, and has a direction upwards and backwards. In the former the lumbar curve is very slightly marked, the buttocks are flat and elliptical, and the vulva is external and very apparent—provocative, if one may venture to use this word; in the latter the lumbar curve is strongly marked, the buttocks are large and prominent, and the vulva is hidden between the thighs, as if modest.

The vagina, considered in connection with the uterus, has not the same direction as the uterus; it has an angle of about fifteen degrees, and forms with the uterus an obtuse angle, opening outwards.

1. **Shape.**—The length of the vagina varies from eight to nine centimetres; and if the penis, which when erected measures fourteen to fifteen centimetres, may be easily received,

it is owing to the great elasticity and the facility with which the vagina stretches. Its calibre is also liable to much individual variation, measuring from the vulva to the neck of the uterus.

The cavity of the vagina ordinarily does not exist, and when empty the anterior and posterior walls of the passage are in apposition, so that, in a transverse cut, the vagina is seen as a transverse fissure of about twenty-five millimetres in length, with the extremities intersected by small arches. The posterior wall of the vagina is longer than the anterior wall, and forms with the neck of the uterus a cul-de-sac, which exaggerates the coition (*pseudo-vaginal passage* of Pajot).

The vaginal passage is remarkable for its folds, which together are named the *lyre of the vagina.* Of these folds, two are longitudinal and median; these are called the *columns of the vagina.* The posterior column is usually poorly developed; the anterior column, on the contrary, is prominent, and ends in a tubercle, *vaginal tubercle*, situated immediately below the urinary meatus, which it serves to indicate when the catheter is passed by the sense of touch. There are also transverse folds (rugæ or ridges of the vagina), which proceed from the columns to the sides of the vagina. Both varieties of folds consist of cavernous tissue, and are more developed in the young. In young girls they form loose folds analogous to the valvulæ conniventes in the intestines. Nature seems to have created them in order to utilize them for the later enlargement of the vagina.

2. Connections.—The vagina is anteriorly in connection with the base of the bladder and ureters, in its upper half; and, in the lower half, with the urethra. In the lower two-thirds the urethra is channelled out of the anterior wall of the vagina. These relations explain the occurrence of cystocele and of vesico-vaginal and urethro-vaginal fistulæ. Posteriorly the vagina is in connection with the rectum, upon which it lies,

in order to form the recto-vaginal partition. Above, the vagina is bounded by Douglas's pouch; and below by the perineum.

The vagina, upon each side, is in connection with a large venous plexus, and, passing downwards, it is in connection with the base of the broad ligament, the subperitoneal cellular tissue, and the ureter; then come the pelvic or superior aponeurosis, the levator ani muscle, and the bulb of the vagina. The levator ani muscle, which is inserted in the fibrous sheath of the vagina, when it contracts causes the vagina, like the rectum, to be drawn towards the pubis; and Budin has pointed out that, in some women, it has the power of preventing, at will the entrance or withdrawal of the penis, during sexual connection.

The upper extremity of the vagina surrounds the neck of the uterus, and is directly continuous with it. It forms around the uterus a circular trench or furrow, deeper posteriorly (posterior cul-de-sac) than anteriorly (anterior cul-de-sac) and upon the sides (lateral cul-de-sacs). The anterior cul-de-sac is in connection with the bas-fond of the bladder, by the intermedium of the peri-cervical cellular tissue. The posterior cul-de-sac, for a distance of twenty-five millimetres, is in connection with the rectum, by the interposition of the utero-rectal peritoneal cul-de-sac, the peri-cervical cellular tissue, and a few utero-vaginal veins. The lateral cul-de-sacs are in connection with the base of the broad ligaments, the ureters, the uterine arteries, and the utero-vaginal veins. All these connections are very important to remember in surgical operations.

3. Structure.—The passage of the head of the fœtus, during labor, through the vagina, is evidence of the elasticity of the canal; the part which is the least extensible is at the vulvar entrance, where the hymen is situated.

The wall of the vagina measures three to four millimetres in thickness, and consists of three superimposed layers: An

external cellular-fibrous layer; a middle muscular layer, consisting of two layers—one internal, circular layer, the other external, longitudinal layer, which, above, are continuous with the superficial layer of the neck of the uterus and utero-sacral ligaments, and, below, are inserted into the ischio-pubic arches and middle perineal aponeurosis. Finally, an internal layer—the vaginal mucous membrane.

The *mucous membrane* of the vagina is smooth or plicated, according to the age of the woman, and the physiological conditions; it measures one to one and a half millimetres in thickness; during gestation it is deep red in color (a diagnostic symptom at the beginning of pregnancy); it is very firmly adherent to the subjacent muscular layer. It does not slide or unfold like the uterine mucous membrane, but as it is very elastic, its folds may be effaced when it is stretched. The mucous membrane of the vagina is covered with a stratified pavement epithelium; it possesses no glands; it is rich in elastic fibres, and elevated in numerous papillæ, which are not visible, on account of being situated deep in the epithelium. Above, the mucous membrane of the vagina is reflected over the mouth of the uterus; below, it is continuous with the mucous membrane of the vulva. The hymen is located at the lower extremity of the mucous membrane.

FIFTH ARTICLE.

THE HYMEN.

The hymen is a membranous fold, formed by a prolongation of the vaginal mucous membrane, which in virgins incompletely closes the entrance to the vagina. According to Budin, it is only the inferior extremity of the vagina which projects into the vestibule.

The existence of the hymen may be considered as constant,

FIG. 8.—SEMILUNAR HYMEN.

FIG. 9.—ANNULAR HYMEN.

a fact to be remembered in medico-legal medicine; although in rare cases it may be very rudimentary.

1. Shape.—The hymen varies in shape; there are, however, three principal shapes:

1st. The *crescent* or *semilunar shape* (Fig. 8) occurs the most

FIG. 10.—ANNULAR HYMEN IN A YOUNG GIRL SEVENTEEN YEARS OLD.

FIG. 11.—LABIATED HYMEN.

FIG. 12.—LABIATED HYMEN.

frequently; in this variety the opening is seen at the anterior part; the convex or adherent border of the membrane is at the postero-lateral wall of the vulvar ring or opening; the concave border is in front, and the two ends gradually taper, terminating one on each side of the tubercle of the vagina.

2d. The *annular* or *diaphragmatic shape;* in this variety there is a ring with a more or less central opening (Figs. 9 and 10).

3d. The *linear* or *labiate shape;* in this variety there are two vertical lips, more or less fringed, limiting an antero-posterior slit (Figs. 11 and 12).

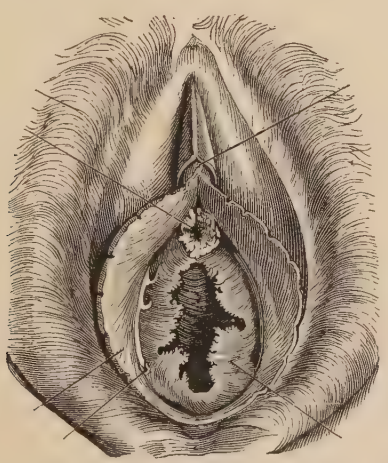

Fig. 13.—Fringed Hymen.

The hymen may also be naturally in fringes (Fig. 13), or be replaced by a simple band (Fig. 14).

These are the important shapes of the hymen most usually met with, and should be remembered in relation to medico-legal cases.*

* Ambroise Tardieu: *Étude médico-légal sur les attentats aux mœurs,* 7th éd., Paris, 1878; Vibert: *Précis de médecine légal,* 2d éd., Paris, 1889.

In some cases the hymen is not perforated, and completely closes the entrance of the vagina. This malformation will be described later.

2. Structure.—In all cases the hymen consists of a fold of the vulvo-vaginal mucous membrane, in which there runs a network of connective tissue and elastic tissue, constituting

FIG. 14.—VERTICAL BAND SUBSTITUTING THE HYMEN.—(*Huguet.*)

the skeleton of the membrane, and containing the vessels and nerves of the organ. The hymen is quite vascular, and when torn there occurs considerable hæmorrhage. In some cases the membrane is so thick as to offer an obstacle to sexual connection; in other cases it is so extensible and elastic that the penis, or any foreign body, may be introduced into the vagina without the membrane being ruptured. Therefore it is to be

remembered that an unbroken hymen is not always a positive sign of virginity.

The hymen, as a rule, is ruptured during the first sexual congress. The shape of the tear varies. Most frequently the membrane is divided into three or four fragments, which retract and are gradually transformed into tubercles or a resemblance to a cockscomb, which has been compared to myrtle berries and named *myrtiform carunculæ*. At other times, after the rupture, there remain loose shreds; and, again, a circular opening—hymenal ring.

A recent rupture of the hymen is recognized by its blood-red appearance, and by the swollen aspect of its edges—important signs to recall in cases of rape.* On the contrary, when the rupture is not recent, there is an absence of redness and of all traces of inflammation.

The hymen appears about the fifth month of fœtal life. It is not peculiar to the human species, since it is met with among certain animals.

Later it will be seen that the origin and morphological importance of the hymen are still subjects of discussion.

While Blandin, in France, and Henle, in Germany, generally admit that the hymen is a simple projection of the inferior extremity of the vagina,—a kind of membranous swelling or collar at the entrance of the vagina,—which view has recently been insisted upon by P. Budin, S. Pozzi, in France, vigorously contests this theory. He believes that the hymen is independent of the vagina; it belongs, he says, to the external genital organs, and to prove his view, he refers to several cases of the malformation, in which the hymen was present with complete absence of the vagina (Pozzi, Hofmann, Grohe, Zweifel, Las Cazas de Santos, etc.).

* A. Tardieu: *Étude médico-légal sur les attentats aux mœurs*, 7th éd., Paris, 1878.

SIXTH ARTICLE.

VESSELS AND NERVES OF THE INTERNAL GENITAL ORGANS.

1. Arteries.—The circulation of the ovaries and uterus is very abundant, not alone for their nutrition, but to provide for the demands of menstruation and gestation.

The *ovarian artery* comes directly from the abdominal aorta; descends in the pelvis, enters the broad ligament, and furnishes an ovarian and a tubular branch.

The uterus is nourished with red blood from the *uterine artery*, which comes from the hypogastric, passes transversely towards the neck in following the base of the broad ligament, turns at this point and passes upwards along the lateral border of the uterus, in order to anastomose with the ovarian artery at the point of insertion at the cornua of the uterus. In its course the uterine artery, at the point where it bends, gives off several small branches to the vagina and bladder, also to the neck of the uterus, and from the last a transverse branch, which anastomoses with a branch from the opposite side, in order to form the circle of Huguier. Above, in the body of the uterus, the uterine artery gives off numerous arterioles to the walls of the uterus. These arterioles are remarkable for their tortuous course; this peculiarity is met with in all arteries of organs which are subject to rapid changes in volume.

The artery of the round ligament, *funicular artery*, is united to the uterine artery; it comes from the epigastric artery, and passes to the uterus, following the round ligament.

The vagina has a special artery, the *vaginal artery*, which

comes from the hypogastric artery; it follows nearly the same course as the uterine artery, as far as the neck of the uterus; then passes downwards, in order to enter the corresponding border of the vagina, where it furnishes branches for the anterior and posterior walls of the canal, and also important branches for the neck of the bladder, urethra, and bulb of the vagina.

2. Veins.—The veins correspond to the arteries.

At the hilus of the ovary is found a rich venous plexus, the *ovarian plexus*, which forms the *sub-ovarian plexus;* this latter, with the veins coming from the body of the uterus, constitutes the *pampiniform plexus*, which ascends with the muscular fibres of the posterior round or utero-lumbar ligament to the lumbar region, and, finally, terminates in a single vein, the *ovarian vein*, which empties into the right vena cava, at an oblique angle; the renal vein on the left side empties at a right angle. To this anatomical construction it is thought that the greater frequency of left ovarian varicocele may be attributed.

The submucous venous plexus of the uterus terminates in a system of gaping *sinuses*, excavated in the muscular tunic of the uterus, only fully developed during gestation, and in which sink the vascular tufts of the placenta. The vessels of the fœtus bathe in these sinuses, as in a lake of blood, and one may, in a measure, understand how the interchange of blood takes place between the fœtus and mother. These sinuses are the large spaces which remain open after labor, and expose the woman to hæmorrhages and puerperal infections. They are open to all kinds of contagion, and the physician should always be on his guard to prevent infection. The sinuses empty into the *uterine plexus*, which occupies the lateral borders of the uterus, and extend to the ovarian and vaginal plexus without interruption. These latter plexuses, in their turn, terminate in the *uterine vein*, which empties into the hypogastric vein. They anastomose with those of the bladder and rectum; so

that all the venous circulation of the true pelvis is common to the different viscera which it contains.

Finally, there is the *plexiform vein of the round ligament*, which communicates with the utero-ovarian, and descends towards the inguinal canal, where it terminates in the epigastric vein and femoral vein. It is a vein of derivation for the blood of the uterus during pregnancy.

The *vaginal veins* are very large, they begin as a network in the mucous membrane and muscular layer of the vagina; they emerge externally and unite to form a large plexus, the *vaginal plexus*, which, above, joins the uterine plexus, and, below, the plexus of the bulb; in front it unites with the vesical plexus, and, behind, with the hæmorrhoidal veins. These plexuses unite to form a single vein, the *vaginal vein*, which becomes the hypogastric vein.

3. Lymphatic Vessels.—The lymphatic vessels of the uterus have their origin from three sources: from the mucous membrane, from the muscular tunic, and from the subserous membrane. The efferent vessels of the ovarian, tubular, and uterine lymphatics follow the same course as the blood-vessels, which they accompany, in order to terminate in their glandular reservoirs. The first group, those from the mucous membrane, follows the round ligament and terminates in the inguinal glands; the second group, those from the muscular layer, comes from the neck of the uterus, follows the uterine artery, and terminates in the lateral glands of the pelvic cavity, a few end in the sacral glands; the third group, those from the serous membrane, comes from the body of the uterus, ascends toward the cornua of the organ, then follows the ovarian artery in the broad ligament, unites with the ovarian and tubular lymphatics, and with them empties into the lumbar glands.

These lymphatics, without considering the veins, are canals which may carry septic products, and give rise to abscesses in

the utero-vesical and utero-rectal cul-de sacs, and in the iliac fossa, pelvis, etc. Cancer of the neck of the uterus infects the lateral pelvic and secondarily the sacral glands. Cancer of the body of the uterus infects the lumbar chain, and may also reach the iliac and inguinal glands, through the lymphatics of the round ligament.

Nearly all the *lymphatics* of the vagina connect with those of the neck of the uterus, and thus pass to the lateral pelvic glands. A few, however, at the junction of the vulvo-vaginal region, pass to the inguinal glands.

4. Nerves.—*The nerves of the uterus* come from the third and fourth sacral nerves, and from the great sympathetic through the hypogastric plexus. The nerves enter the organ at the lateral hilus; the majority pass to a ganglion located at the side of the neck of the uterus, Frankenhäuser's ganglion.

The *nerves of the vagina* come from the hypogastric plexus.

SEVENTH ARTICLE.

THE VULVA.

The *vulva* includes all the external genital parts of woman; that is: the *mons veneris*, the *labia majora* and *labia minora*, the *clitoris*, and the *vestibule;* into the last open the *urinary meatus*, the inferior orifice of the *vagina*, and the *vulvo-vaginal glands*.

The vulva presents great individual differences, which Huguier* thinks are as varied as the facial expressions. However, it is generally seen in the form of a longitudinal slit or fissure, six to seven centimetres in length, bounded upon each side by a prominent border, the labia majora. In fat women the slit or fissure is closed; in thin women, it is gaping; when in the upright position, it is horizontal; however, Charpy has pointed out that it looks a little forward in women who have the pelvis straight; and, on the contrary, when the pelvis is strongly curved it looks backwards.

1. Mons Veneris.—This name is given to the triangular prominence of cutaneo-adipose tissue which lies above the vulva and at puberty is covered with hair.

2. Labia Majora.—The large lips are two large cutaneous folds, which are in apposition at their internal surfaces and limit the vulvar slit or fissure. These folds, above, begin at the mons veneris, very close together, but without forming a

* Huguier: *Mémoire sur les maladies des appareils sécréteurs des organs genitaux externes de la femme* (*Mém. de l'Acad. de médecine*, 1850, t. xv, p. 527).

commissure, and are again united posteriorly at the median line, in the perineum, forming a fold, a commissure poorly marked, which, below, bounds the entrance to the vulva; it is the *fourchette;* this is very often torn during labor. Anterior to the fourchette there is seen a small depression, which separates it from the entrance of the vagina or insertion of the hymen; this is the *fossa navicularis.*

The external surface and free border of the labia majora are rounded and curved; they are pigmented and covered with

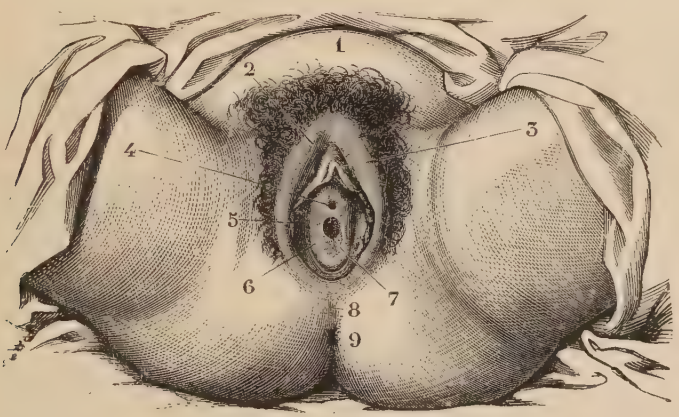

FIG. 15.—VULVA.

1, Mons veneris; 2, labia majora; 3, clitoris; 4, urinary meatus; 5, labia minora; 6, hymen; 7, orifice of the vagina; 8, perineum; 9, anus.

hair. Their internal surface is in apposition with the labium minorum and labium majorum of the opposite side. This surface is smooth, red or more or less pigmented, and is covered only with downy hair. Their adherent borders are fastened by fibres to the ischio-pubic rami and crural aponeuroses.

The labia majora are folds of the skin in which are found numerous and large sebaceous and sudorific glands. The folds resemble a double non-united scrotum. Beneath the skin is seen

a reddish layer of smooth muscular fibres, analogous to the dartos muscle found in the scrotum of man. Like the scrotum, they are attached above by an elastic suspensory ligament. The abdominal fascia furnishes the elastic aponeurosis and elastic lamellæ, which are connected to the deep surface of the lips; they form spaces filled with cellular adipose tissue, giving the labia their shape and support. The elastic layer is arranged so as to form a kind of sac, open at the neck of the inguinal ring, which receives the round ligament, with veins and a mass of adipose tissue, enveloped in a fibrous pouch, and united to the fascia of the perineum and thigh. This is the *dartos sac* of Broca, which gives to the labia majora their firmness; it is not absolutely analogous to the dartos sac of the scrotum, and it is better simply to call it the *adipose sac* of the labia majora, on account of the mass of fat which it always contains.

When the end of the round ligament is drawn with some force, there may be seen in the sac a diverticulum of the peritoneum, the canal of Nuck. Here may occur a congenital hernia.

Hydrocele in woman, also described as serous tumors of the labia majora, are cysts developed in the canal of Nuck.

3. Labia Minora.—The small lips or *nymphæ* (guardians of the water, guardians of the temple) are two cutaneous folds having the appearance of mucous membrane, located at the internal surface of the labia majora and surrounding the entrance of the vestibule.

The length of the labia minora varies, but when normal they should not project beyond the vulva. Among some tribes in Africa they attain the enormous length of fifteen to twenty centimetres, and are named *aprons of the Hottentots.*

The posterior extremities of the small lips are insensibly lost in the internal wall of the large lips; exceptionally they may extend as far as the fourchette. Their anterior extremity is bifurcated, and each bifurcation, at the median line, is united to the one of the opposite side; the lower bifurcation is inserted

in the inferior surface of the clitoris, where it forms the *frænum of the clitoris*, which holds this organ arched downwards; the upper bifurcation passes over the clitoris and forms, with that of the opposite side, a kind of hood, which covers the clitoris and is named the *prepuce of the clitoris*.

The labia minora are formed of a kind of transitional skin, in which are found sebaceous glands; these are first seen in young girls, and reach their full development at puberty; after the menopause they atrophy and disappear. These glands secrete an unctuous, whitish secretion, that has a very penetrating odor, which gives the vulva its peculiar odor, so varied that it is almost special to each woman. The secretion serves to preserve the suppleness of the tissues, necessary for sexual connection and labor.

The derm of the small lips has the appearance of a mucous membrane; in the epiderm are numerous papillæ and sensitive corpuscles, *voluptuous corpuscles;* in the latter terminate the nerves.

Finally, in the fold constituting the labium minorum is found fibro-elastic tissue, enclosing a venous plexus.

4. Vestibule of the Vulva.—The vestibule of the vulva is an infundibuliform cavity situated between the labia minora and the opening of the vagina and urethra. Some anatomists have divided the vestibule into a *urethral* and a *vaginal part*.

The *urethral meatus* limits the lower boundary of the urethral part; closed or partly open, it is seen as a linear or radiating slit, above the vaginal tubercle, and, like the tubercle, is more or less exposed or hidden. The meatus is generally surrounded by an elevation of the mucous membrane, more or less regular, upon each side of which are seen the openings of the *two large juxtaurethral sinuses*, the depth of which varies from two to twenty millimetres. These have been described under the name of *accessory canals of the urethra*.

The vestibule, in young girls, is deep and forms a true *vulvar canal*, in which attempts at defloration may be practised. If these attempts are frequently repeated, the hymen may be pushed back, and thus is formed a veritable funnel or pouch, suitable for copulation. This condition, however, is much more marked in women who have not had the hymen torn during sexual connection.

5. Clitoris.—The clitoris is an erectile organ, analogous to the cavernous bodies in man.

The clitoris has its origin from the ischio-pubic rami of the pelvis by two *crura of the clitoris*, four centimetres long, which converge in front of the pubic symphysis and unite to form a cylindrical body, *body of the clitoris*, about three centimetres long, which terminates in a moss-like extremity, to which is given the name of *glans clitoridis;* this is covered by a hood formed from the labia minora. Like the penis, the clitoris is suspended from the pubic arch by an elastic ligament, *the suspensory ligament of the clitoris.*

In the mucous membrane covering the glans, which is the same as that of the vulva, are found numerous papillæ with sensitive corpuscles (*genital corpuscles*, *voluptuous corpuscles*), which make the clitoris an organ of extreme sensibility in sexual excitement.

6. Bulbs of the Vagina.—The bulbs of the vagina are two erectile organs, situated on each side of the vaginal opening. Their base corresponds to the fossa navicularis; their apex to the junction between the clitoris and urinary meatus, so that they somewhat resemble a horseshoe. Their anterior border corresponds to the base of the labia minora; their base is fastened to Carcassonne's ligament, or middle aponeurosis of the perineum; their internal surface surrounds the inferior extremity of the vagina and urethra.

The bulb of the vagina is analogous to the bulb of the urethra in man. It is an erectile ring, which is congested and erected during the venereal orgasm, in such a manner as to seize the male member during copulation and thus excite the sexual sensibility.

7. Glands of Bartholin.—With the exception of the glands of Bartholin, there are found no glands in the vestibule of the vulva; the so-called mucous glands are not glands but mucous sinuses. Discovered by Duverney, in the cow, and first described by Bartholin in woman, the *glands of Bartholin, vulvo-vaginal glands*, are racemose glands, the size of an apricot stone; their excreting canal, fifteen to twenty millimetres long, opens at the side of the vestibule, anterior to the insertion of the hymen or its remains, the myrtiform carcunculæ.

The two glands of Bartholin (Fig. 16, 3) are situated one on each side of the entrance of the vagina, between the wall of this passage, to which they are attached, and the bulb of the vagina, which covers them. These glands vary greatly in size in different individuals, and in the same individual; they acquire their largest volume during the active sexual life of the woman. Huguier believes they increase in size with the number of sexual excitements, and that the enlargement is in direct connection with that of the ovaries and clitoris. Bartholin's glands are analogous with Cowper's glands in man, and, like the latter, they secrete a clear and ropy fluid, which is only discharged during the venereal orgasm, and is the only ejaculation of woman.

One can understand that any excitation of the genital parts cannot take place without being immediately experienced by these glands, when one knows that they receive their vessels and nerves from the same source as do the vulvo-vaginal orifice and the clitoris.

Gonorrhœal inflammation of these glands is not an infrequent occurrence and results in a *venereal Bartholinitis*.

8. Blood-vessels of the Vulva.—The blood-vessels of the vulva come from the hypogastric and crural vessels. The lymphatic system comes from the inguinal glands. This an-

FIG. 16.—MUSCLES OF THE PERINEUM IN WOMAN (MUSCLES OF THE ANUS AND ENTRANCE OF THE VAGINA).

1, Crura of the clitoris; 2, clitoris; 3, Bartholin's gland; 4, bulb of the vagina; 5, ischio-cavernosus muscle; 6, constrictor of the vagina; 7, transverse perineal muscle; 8, middle aponeurosis of the perineum; 9, external sphincter of the anus; 10, elevator muscle of the anus.

atomical construction is important to remember in pathological conditions.

9. Muscles of the Vulva.—The muscular system (Fig. 16) of the vulva resembles that seen in man. It is annexed to the

external genital organs for the purpose of determining erection and to accomplish the sexual act.

There are found upon each side of the median line:

An *ischio-cavernosus muscle*, which sends the blood into the clitoris and causes erection;

A *bulbo-cavernosus*, or *constrictor of the vagina*, which contracts the entrance of the vagina, and compresses the bulb, sending the blood in jerks to the clitoris;

A *superficial transverse perineal muscle*, the action of which has the same result as the two preceding muscles.

10. Differences in the Appearance of the External Genital Organs.—The appearance of the external organs varies according to the age and habits of the woman.

In small girls the clitoris is seen to be relatively large, uncovered by the labia minora, and projecting between the labia majora, which are separated. If this same appearance is met with later in life, it is regarded as an evidence of masturbation.

In adult women the labia majora are seen to be closed, smooth, and red in color; they are in apposition, so that as the clitoris and labia minora are hidden, and the orifice of the vulva is closed, it is seen only as a slit or fissure.

In women who have borne children the fourchette has generally been ruptured, and the vulva is seen to be gaping in front and below.

The labia majora and minora have a variable morphological value. Among the monkey tribes there are found neither large lips nor mons veneris; while among young anthropoids a trace of these structures is met with, which soon atrophies. The clitoris and small lips, on the contrary, are large, and, in some, the clitoris acquires the size of the male penis. This is also seen in the white fœtus; in European girls when quite young; in women of inferior races, notable the Caffres, the Abyssinians, the Negresses.

The labia majora and the mons veneris may then be considered as evidences of perfection; the clitoris and labia minora as the fundamental organs of copulation.

The apron, which we have mentioned as met with among Hottentots, is sometimes seen among European women. This condition often coincides with atrophy of the labia majora and mons veneris. In the countries where this enlargement is habitual, the operation of circumcision of the small lips is practised.

EIGHTH ARTICLE.

THE MAMMARY GLANDS.

Although the *mammæ*, the breasts of woman, are not part of the genital organs, we will, however, give a brief description of them, since from a physiological point of view the mammary glands are very intimately related to the genital organs of woman.

Their anomalies are, however, so curious that we will further on give a short description of them.

1. Shape.—The mammæ, in man, are rudimentary during life; in woman they remain rudimentary until puberty, at which period they develop, and during gestation they become greatly enlarged, especially after labor and during lactation. Their shape is hemispherical; they are situated upon the anterior wall of the thorax, on each side of the sternum, extending from the third to the seventh rib, and surmounted at their top by a large prominence, the *nipple*.

In the young girl the mammæ are resisting, elastic, firmly fixed, and provocative; while in thin, weakly, or aged women they become soft, flaccid, and pendant. The very elongated and pendant mammæ are peculiar to the Hottentot and Caffre races.

2. Structure.—The skin which covers the mammæ is smooth, soft and white, covered with delicate, downy hair. Surrounding the nipple is seen a zone, which, in young girls, is pink in color, and in women who have had children is brown; this zone is

named the nipple *areola*. The areola is wrinkled, owing to the presence of large sebaceous glands in the skin, which are connected to the hair follicles. Some of these glands are so largely developed that they form small rounded prominences, and are called the *tubercles of Morgagni*. During pregnancy these glands are very much increased in size, and are then named the *glands of Montgomery*, and may during pregnancy secrete milk.

The nipple is pink or brown in color; it is covered with large

FIG. 17.—DISSECTED MAMMA TO SHOW ITS STRUCTURE.
a, *a*, Galactophorous ducts, having their origin in the lobules of the gland and opening at the nipple.

papillæ, between which open the lactiferous ducts; that is, the excretory ducts of the mammæ (Fig. 17).

Within the mammary nipple are found smooth muscular fibres, which under the influence of excitement cause the nipple to become erected.

From a morphological point of view the mamma is a gland developed from a budding of the deep epidermis, the same as the other glands of the skin (sebaceous, sudorific). It is a racemose gland of the skin, which is specially adapted for the

function of maternity and nursing. The mamma is situated in a mass of subcutaneous cellulo-adipose tissue. This tissue forms a kind of matrix, through which run the vessels and nerves, and, except during gestation and lactation, constitutes nearly the entire gland.

The mamma being only a special and differentiated cutaneous gland, it is not surprising that there are at times found developed supernumerary mammæ, situated on the thorax, back, abdomen.

3. Functions.—During the first three or four days after labor the mammæ secrete a serous, opaque fluid, called the colostrum, which is followed by a fluid emulsion, alkaline, sweet, fatty, albuminous, the precious *milk*.

At birth even the male mammæ may swell and discharge a small quantity of whitish fluid, which is called the *milk of the new-born*. This phenomenon may again occur at puberty. While the mammary glands remain almost the same in the small girl and small boy, at puberty, in the young girl, they become greatly developed, but in the young boy they remain rudimentary.

At the menopause the mammæ become permanently atrophied.

CHAPTER II.

DEVELOPMENT OF THE GENITAL ORGANS.

If it was necessary to describe the anatomy of the genital organs of woman, in order to know the exact normal condition of this particular part of the body, the following cursory view of the embryological origin of the same organs is not less necessary, in order to understand defects of development, which most often constitute teratological cases, otherwise called malformations.

One of the best established laws of teratology teaches us that malformations are almost invariably the result of an arrest or perversion of development; therefore, in order to explain them, it is necessary to follow the evolution of the organ during its entire embryonic life. It is then essential that a description of the embryology of the genital organs should be given.

1. Development of the Internal Genital Organs.—The internal genital organs have the same origin in both sexes. They come from the Wolffian bodies, Müller's canals, and the genital glands. The same is also true of the external genital organs; both in the male and female the organs come from the genital tubercle and genital folds.

The *Wolffian bodies, primordial kidneys*, are transitory organs —a temporary kidney in the higher vertebrates, which is well developed at the thirty-fifth day of intra-uterine life, and disappears at the end of the second month. It extends upon each side of the vertebral column, from the lowest part of the pleuro-peritoneal cavity as far as the pelvis, and has the appearance of a fusiform and glandiform organ. It consists of: 1st, a longi-

tudinal excretory duct, the *canal of Wolff*, which passes downwards, and opens into a common cavity, posterior to the intestine and to the allantois, called the *cloaca;* 2d, a number of transverse ducts, at first straight but becoming tortuous, one of the extremities ending in a cul-de-sac, the other in the preceding excretory canal. These canaliculi, called *canaliculi of the Wolffian body*, also the Wolffian canal, which follows the antero-external portion of the glandular body called the *Wolffian body*, are surrounded by a mass of connective tissue, which unites them together, to form a distinct and autonomous body. By their blind extremity the canaliculi surround a vascular glomerule, *Malpighian glomerule*, which is supplied by a branch from the aorta, thus constituting a gland that temporarily plays the physiological rôle of the kidney; these latter organs, the kidneys, are later developed, above and behind the Wolffian bodies.

Within the Wolffian body there appears, about the fifth or sixth week, the outline of a new organ, the *genital glands*. These, at first, present the form of a small, whitish band, which projects into the internal part of the Wolffian body. This prominence is called the *genital eminence;* it is covered by the pleuro-peritoneal epithelium, which Waldeyer, in 1870, named the *germinating epithelium*. From this epithelium come the essential elements of the genital glands; that is, the *primordial ovules*, which in the beginning have absolutely the same morphological value in both sexes; later differentiated, in the cells of the male, into the testicle, and in the female, into the ovary. The genital glands are then primary, indifferent, and undetermined organs. Later, however, they form either a testicle or an ovary.

At the same time that these phenomena take place, a new duct is seen to form parallel to and located a little outside of the Wolffian duct. This duct is *Müller's duct*, which when formed opens at the top into the peritoneal cavity, where later

it constitutes the pavilion of the uterine Fallopian tube. This duct is joined below by its fellow of the opposite side and opens into the *cloaca*.

Later the *permanent kidneys* are developed behind and above the Wolffian bodies; the latter atrophy. The excretory duct of the kidney, the *ureter*, is developed from the inferior extremity of the Wolffian canal; this explains the cases of anastomosis of the ureters into the deferens canal, which are, in man, the persistent Wolffian canals, the excretory duct of the kidney or ureter, which opens into the *urinary bladder*. The *bladder*, as well as the *urethra*, is developed from the *allantois*, which is only a vesicle developed from the ventral wall of the posterior intestine of the embryo. The part of the allantois which extends from the bladder to the umbilicus constitutes the *urachus;* this later becomes the superior or suspensory ligament of the bladder; the portion which passes through the umbilicus, and that which is developed external to the embryo, constitute the fœtal placenta.

The cavity or outlet of the Wolffian canals, Müller's ducts, and the ureters form the so-called *uro-genital sinus*, which, in man, passes into the posterior urethra, and, in woman, into the vestibule of the vagina. But as this cavity, posteriorly, freely communicates with the rectum or posterior intestine, it is also called the *cloaca*. During embryonic life man then possesses a cloaca similar to the inferior mammiferæ, birds, and reptiles.

Until the third month there is nothing to indicate the sex; at this period the embryo is neuter or indifferent, or, better to say, it has the elements of both sexes, it is a hermaphrodite.*

At this period, the third month, evolution begins to take place in the Wolffian bodies, Müller's duct, and genital glands, either to the male type or the female type.

* Ch. Debierre: *l'Hermaphrodisme*, Paris, J. B. Baillere et fils, 1891.

If it is the former, male type (Fig. 18), Müller's ducts are obliterated and disappear, leaving only a trace of their inferior extremity, where they are united together, in order to empty into the uro-genital sinus by a common orifice, the *prostatic utricule* or *male vagina*.

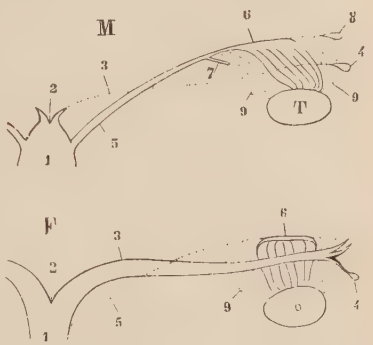

FIG. 18.—FORMATON OF THE INTERNAL GENITAL ORGANS OF BOTH SEXES (DIAGRAM).

M, *Male type: T*, testicle; 1, uro-genital sinus; 2, inferior extremity of the two Müller's ducts forming the prostatic utricle or vagina of the male; 3, portion of Müller's duct which disappears; 4, free extremity of the same duct which forms the hydatid pedicule of Morgagni; 5, Wolffian canal; 6, portion of the canal corresponding to the epididymis (the re mainder corresponds to the vas-deferens); 7, Haller's vas-aberrans; 8, sessile hydatid; 9, portion of the Wolffian body which disappears (the part not dotted represents the portion which forms the head of the epididymis).

F, *Female type: O*, ovary; 1, uro-genital sinus; 2, uterus; 3, Müller's duct forming the Fallopian tube; 4, extremity of Müller's duct forming the hydatid of the Fallopian tube; 5, Wolffian canal which has disappeared in the greater part of its extent; 6, its persistent portion, forming with the canals from a part of the Wolffian bodies the Rosenmüller's organ analogous to the head of the epididymis; 7, portion of the Wolffian body which disappears.

At this same period, the superior or genital part of the Wolffian body is connected to the genital gland, and forms the cones or efferent canals of the head of the epididymis; while the body and tail of this latter organ, also the vas-deferens, with its diverticulum—the seminal vesicles—and the ejaculatory ducts, come from the Wolffian canal. The genital glands are transformed into the testicles, and its primordial ovules take the nature of male ovules or spermatozoids.

If, on the contrary, it is the female type (Fig. 18), the genital gland is transformed into the ovary, and the primordial ovules become the ovarian eggs; during this period Müller's duct remains, while the Wolffian body and canal undergo retrograde

FIG. 19.

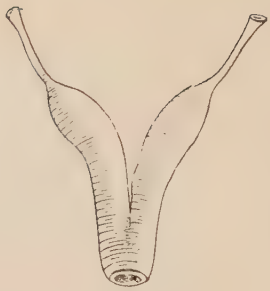

FIG. 20.

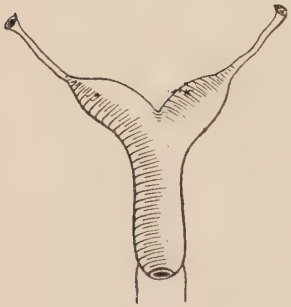

FIG. 21.

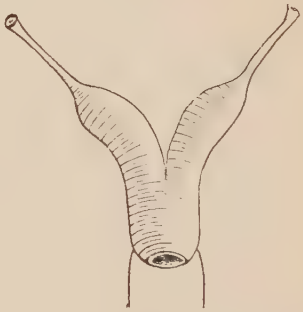

FIG. 22.

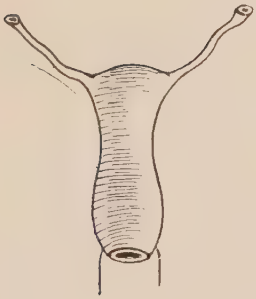

FIG. 23.

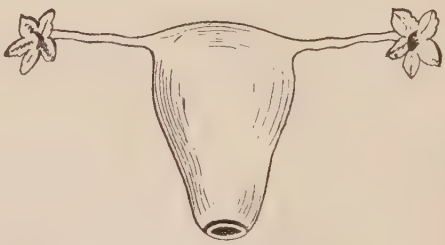

FIG. 24.

FIGS. 19 to 24.—DEVELOPMENT OF THE UTERUS.

Progressive fusion of the two Müller's ducts, giving successively origin to the two uteri and two vaginas (Fig. 19, marsupial type), to two uteri and a single vagina (Fig. 20, rodent type), to a bicornous uterus (Figs. 21, 22, carnivorous, ruminant, etc., types), finally, Figs. 23 and 24, to two oviducts, a single uterus, and a single vagina (man and monkeys).

change, leaving as a residue the *organ of Rosenmüller*, in the tissue of the broad ligament. In regard to Müller's ducts (Figs. 19 to 24), they form, by their superior part, the Fallopian tube, and, by their middle and inferior part, which unite together to furnish the utero-vaginal canal, the vagina and uterus. This union begins at the inferior part, and the duct, at first very short, opens, as has been mentioned, into the uro-genital sinus. At the end of the second month, the two Müller's ducts are united together, like the two barrels of a gun, but still separate in their entire length, except at the mouth, by a median partition resulting from this juxtaposition. This cursory glance at the work of fusion, which gives origin to the oviducts, uterus, and vagina, indicates how arrests in development may occasion malformations of the internal genital organs of the female.

The constant connections of the hymen with the urinary meatus and the base of the clitoris have been pointed out by S. Pozzi, in 1884, and more recently described by O. Schæffer. These connections are formed from what Pozzi calls the *male frænum of the vestibule*, which represent, in woman, according to him, the spongy bodies of the urethra.

According to Pozzi, who disputes the accepted view, the hymen is not a fold of the vaginal opening, but a fold having its origin from the external layer of the blastoderm and coming from the vestibule; therefore it has its origin from the external and not the internal outline of the genital organs. The presence of a single and independent hymen, in cases of double vagina, is evidence of a separate origin of the hymen and of the vagina (Breisky, Corazza, Winckel).

The round ligament of the uterus is formed from the ligament of the *Wolffian body*, *gubernaculum*, *Müller's ligament*, and is attached by the union of its upper third to the two lower thirds of Müller's ducts. It marks out the point beneath which the fusion takes place of the two Müller's ducts, which above

remain separate from it, in order to form the Fallopian tubes.

From this description it is seen that the sex does not pre-exist, at least so as to be recognized when the embryo is formed.

2. Development of the External Genital Organs.—The development of the *external genital organs* (Fig. 25) is in some way regulated by the evolution of the internal genital organs.

Primarily, there exists at the posterior or caudal extremity of the body only an orifice, the *cloacal orifice*, which, as its name indicates, opens into the cloaca, and into which also empty, in front, the urinary bladder by the uro-genital sinus, and, behind, the intestine.

At the sixth week of embryonal life (Fig. 25) there is seen, elevated in front of this orifice, a tubercle, which is named the *genital tubercle*, from which is developed either the penis or clitoris.

This tubercle, a little later, is channelled on its inferior surface by a furrow, *genital furrow*, *genital groove*, which extends as far as the cloacal opening.

The two lips of this furrow are called the *genital folds*, and around the genital tubercle and cloacal orifice is raised a cutaneous elevation, named the *genital swelling* or *eminence*. During this time, that is, in the middle of the second month, the cloaca

FIG. 25.—DEVELOPMENT OF THE EXTERNAL GENITAL ORGANS.

Indifferent state: I, Embryo of 16 millimetres; II, embryo of 20 millimetres; III, embryo of 27 millimetres. *Female type: A*, Embryo of 31 millimetres; *B*, embryo of middle of fifth month; *C*, embryo of beginning of sixth month. *Male type: A'*, Embryo of 57 millimetres (end of third month); *B'*, embryo of middle of fourth month; *C'*, embryo of the end of the fourth month (according to Ecker). 1, Cloaca; 2, genital tubercle; 3, glans; 4, genital furrow; 5, genital elevation (labia majora, scrotum); 6, umbilical cord; 7, anus; 8, coccyx; 9, genital folds (labia minora, urethra of penis); 10, uro-genital sinus; 11, frænum of clitoris; 12, prepuce of glans; 13, orifice of urethra; 14, orifice of vagina; 15, hymen; 16, raphé of scrotum.

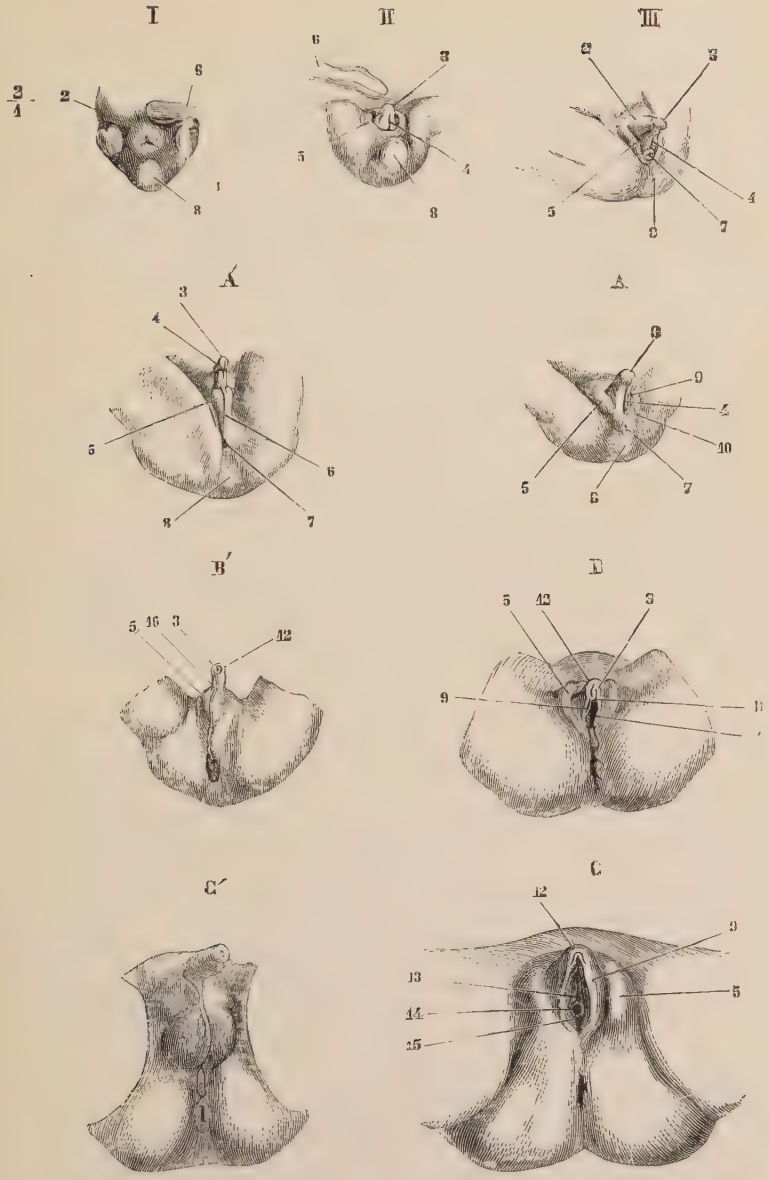

FIG. 25.

is partitioned, by the union of its two lateral prominences, and in consequence of the formation of this frontal partition, *urethro-rectal septum*, this recto-allantoidean cavity is subdivided into two secondary canals: one anterior, the *uro-genital sinus*; the other, posterior, the *anal canal.*

Ultimately the perineum becomes thick and is completed, but there always remains an external trace of the union of the two cornua of the cloaca, in the *perineal*, *ano-scrotal*, *ano-vulvar raphé.*

During the third month the transformation of the cloaca is completed, and the character of the external genital organs, which until this time was the same in both sexes, now turns to one or the other sex. The indifferent genital outline is differentiated, and developed either into the external genital organs of the male, or those of the female.

In the male embryo the *genital tubercle* is elongated and becomes the penis; the genital furrow is closed by the union of its lips to form the penile part of the urethra; the genital folds unite together to form the scrotum.

In the female embryo (Fig. 26) the two lateral halves of the genital swelling remain distinct and separate, and form the labia majora; the genital fold, which on the sides limits the vestibule, is extended over the genital tubercle, and becomes the labia minora and prepuce of the clitoris; the genital tubercle itself remains small and is changed into the clitoris; the uro-genital sinus is changed into a somewhat deep infundibular cavity, the *vestibule*, at the bottom of which opens the vagina, and above the urethra. In the female the entire urethra comes from the uro-genital sinus.

In a word, in the male sex the two halves of the genital swelling unite together to form the scrotum, and the genital folds form the penile urethra. In the female sex the external genital organs remain fissured, and increase in size without changing their shape. From this description it is easy to

understand that the bulb of the urethra, in man, is represented by the bulb of the vagina in woman; and Cowper's glands, in man, by Bartholin's glands in woman.

This brief description of the embryology of the genital organs is sufficient to demonstrate that any incomplete development or

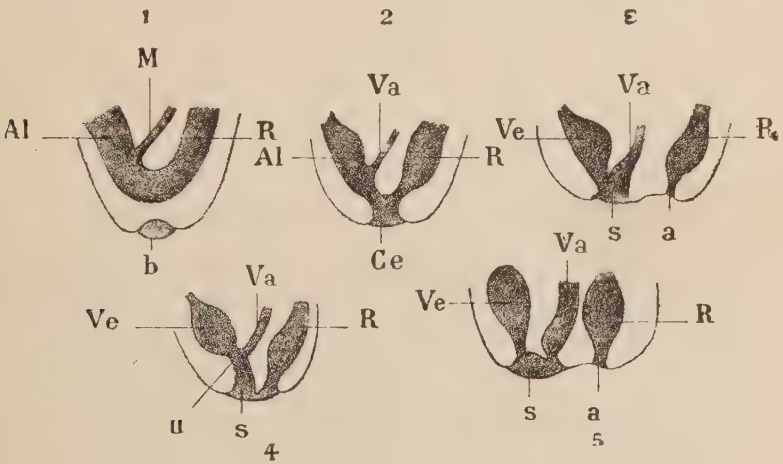

FIG. 26.—DEVELOPMENT OF THE EXTERNAL GENITAL ORGANS OF WOMAN.—(*Schroeder.*)

Fig. 1, *Al*, Allantois, which becomes the bladder; *R*, rectum; *M*, Müller's canal (vagina); *b*, cutaneous depression which becomes the anal opening.

Fig. 2, The depression which opens into the allantois and forms the cloaca, *Ce; Va*, vagina.

Fig. 3, The perineum is formed. The anus and uro-genital sinus (*sa*) are separated; *Ve*, bladder; *a*, anus; *s*, uro-genital sinus; *v*, vagina.

Fig. 4, The urethra (*u*) still forms the direct continuation of the uro-genital sinus (*su*), into which also empties the vagina.

Fig. 5, Completely developed genital organs. The uro-genital sinus has become the vestibule (*s*), into which empties the urethra and vagina, which, however, remain separated by the hymen.

evolution may suffice to occasion a malformation of the system, and from this knowledge it is possible to determine the form of anomaly which the arrest of development will cause. Always, except in some intra-uterine pathological changes which will

be elsewhere explained, the malformation represents the survival of a transitory state in the fœtus.

This truth will be clearly established in the chapters which follow. The preceding chapters have been given in order to better understand the subject.

CHAPTER III.

MALFORMATIONS OF THE GENITAL ORGANS.

In the description of the malformations of the genital and urinary organs of woman,—except the anomalies of the urinary bladder and kidneys,—we will follow the plan adopted in studying the anatomy of these organs. First, we will describe the malformations of the internal genital organs—ovaries, oviducts, uterus, vagina including the hymen; second, the anomalies of the external organs of generation.

FIRST ARTICLE.

ANOMALIES OF THE OVARY.

Among the anomalies of the ovary, there have been described:

1. Complete absence of these glands; but this is so seldom met with that the malformation is very doubtful; the absence of one ovary is, however, more probable;

2. The existence of one or several small supernumerary ovaries, to which J. Paladino has recently called attention, and which is now a well-known condition;

3. Congenital atrophy and hypertrophy of the ovaries;

4. The displacement or ectopias and hernias of the ovaries;

5. Congenital cysts, of which the most interesting are the dermoid cysts.

1. Congenital Absence of the Ovaries.—The *congenital absence* of the ovaries is very rare, and is generally accompanied by an arrest of development of the entire internal genital system.

Vidal (de Cassis), in 1830, presented to the Anatomical Society specimens from a woman in whom the ovary and Fallopian tube of the left side were wanting. Chaussier has reported a similar case, and Thudichum has collected twenty-one cases of this nature. Morgagni, Pears, and Cripps have published cases in which both ovaries were absent.

These cases, however, are so seldom met with that West and de Sinéty deny their existence.

The *effects* of the absence of the ovaries are first, menstruation

does not appear; however, it has occurred that, after the removal of the ovaries, in some cases, the menstrual flow may still occur (Goodmann, Terrier). And, again, as a pregnancy may take place three or four years after the cessation of menstruation (Baker) it is natural to think that menstruation may occur when the ovaries are absent.

Another result from the absence of the ovaries is sterility. It is evident, however, that if only one ovary is absent, the generative function of the woman is not destroyed, provided the existing gland is normal.

The results of the absence of the ovaries, in regard to the sexual functions in woman, are, according to Scanzoni and most writers, that a woman who is deprived of her ovaries loses in great part the attributes of her sex. Cripps reports the case of a young girl, eighteen years old, who had only an infantile uterus and no ovaries; who had never menstruated and possessed none of the signs of puberty. Again, Lauth reports the case of a woman in whom the ovaries were rudimentary, and only the neck of the uterus was developed; she had none of the principal physiological characters of her sex. If the results of castration are considered, it will be found that amenorrhœa, after the castration, coincides with corpulency, atrophy of the mammæ, quieting of the sexual desires, and the slumbering of all erotic passions.

On the other side, Cramer reports the case of a woman, thirty years old, in whom, notwithstanding the absence of the uterus, the venereal desire still existed. In this case menstruation was also manifested in the form of supplementary hæmorrhages (epistaxis, hæmoptysis).

Finally, de Sinéty reports the case of a woman who had normal ovaries, but an infantile uterus, in whom the sexual desire was null. Roubaud, on the other hand, says that some very passionate women have only rudimentary ovaries.

From the above it would appear that there are no well-

marked objective or functional symptoms in cases of absence of the ovaries.

Further investigation of this physiological point shows that ovariotomy almost always causes the premature occurrence of the menopause. Nevertheless, after double castration (Battey's operation) menstruation may continue more or less regular, and for a more or less long time. Storer, Goodmann, Terrier, Campbelle, Tuttle, Bantock, Terrillon, etc., have reported cases of this nature; Ormières has collected forty-five cases in his thesis.* However, Glaevecke† has, from his investigations, concluded that complete stopping of menstruation occurs in eighty-eight per cent. of women who have undergone Battey's operation, and Sänger found that, in forty-nine cases of castration, twice menstruation continued. Yet, with S. Pozzi, we think that when the monthly hæmorrhages persist, if the woman is kept under observation for a long enough time, it will be seen that these hæmorrhages cease at the end of a few months. If they continue some time after the operation, it is owing to the *law of persistence of organic habit*, that is to say, if it may be so expressed, in virtue of acquired momentum.

Finally, the existence of the ovaries is independent of the absence of the uterus and of the vagina, and there may be an absence of all the utero-vaginal canal (vagina, uterus, and oviducts), and, notwithstanding this, the woman with such a malformation may have the ovaries in their proper position. Embryology demonstrates that the ovary comes from a different source than that which gives origin to the utero-vaginal canal, and it is then easily understood that this variety of malformation may take place.

It may be said parenthetically that if the congenital absence of the ovaries is infrequent, it is not so with their removal by

* Ormières: *Sur la menstruation après l'ovariotomie et l'hysterectomie* (*Thèse de Paris*, 1880).

† Glaevecke: *Arch. für Gynäk.*, Bd. xxxv, Heft. 1, 1889.

operation; since oöphorectomy (Battey's operation, castration of the female) is quite frequent.* Hégar, in 1881, had himself castrated forty-two women, and F. Keppler (of Vienna) had personally castrated forty-six women. If marriage with a castrated woman seems certainly to be an ideal malthusian marriage, it is none the less true that most men do not prefer marriage with this kind of a woman.

2. **Supernumerary Ovaries.**—If congenital absence of the ovaries is infrequent, *supernumerary ovaries* are also seldom met with. However, from the investigations of Beigel, Puech, Thudichum, Winckler, de Sinéty, Paladino, it is certain that this malformation is not so very infrequent. It is owing to the presence of small supernumerary ovaries that after Battey's operation, according to some writers, the menstrual hæmorrhage continues.†

3. **Atrophy of the Ovaries.**—*Atrophy* of the ovaries, it is true, may result from an arrest of development. This atrophy resembles that which normally follows the menopause, and consists in the disappearance of the ovules and ovisacs, with fibrous degeneration of the ovary; this may take place before puberty, and from unknown causes, excluding pathological conditions (neighboring inflammations, ovaritis, etc.).

Sterility is a positive result of this anomaly.

4. **Displacement and Hernias of the Ovaries.**—Among the anomalies of the ovaries, one of the most interesting to recognize in pathology is the *displacement;* it is frequently congenital.

The ovary may be displaced in different places: in Douglas's

* Emmet: *La Pratique des Maladies des femmes*, Paris, 1887.

† See page 66.

cul-de-sac, in the inguinal canal, in the labia majora, etc. This ectopia may exist alone or in connection with some uterine displacement.

Prolapsus of the ovary into Douglas's cul-de-sac may be diagnosed by the vaginal or rectal touch, since *nausea* is a very characteristic symptom when the small tumor is pressed upon, and especially if there is also pain during sexual connection and defecation.

Lund has reported a case of hernia of the ovary in a woman who had no uterus; the vagina was only rudimentary, but the vulva was well developed.* Generally, however, hernia of the ovary coincides with a malformation of the genital organs, notably of the uterus.

Mundé, Heywood, Smith, Barnes, Lentz, T. More Madden, etc., have all reported cases of ovarian hernias, and given the diagnosis and treatment to be followed in these cases.†

The works of Barnes ‡ and Lentz§ on this subject may be read with interest.

Inguinal hernia of the ovary is the variety most frequently met with. Puech has collected eighty-eight cases of this nature; while of *femoral hernia of the ovary* only fourteen cases were observed. The inguinal variety of this hernia is frequently double; on the contrary, the femoral variety occurs almost always only on one side. The only case of double femoral hernia of the ovary we know of, is that published by Otte.‖ J. Cloquet has reported a curious case of femoral hernia of the ovary, in the sac of which was also found the uterus and Fallopian tube (Fig. 27). The presence of an ovary in an

* Lund: *Magazin für Lægevidensbaden, Norsk.* No. 12, 1887.

† Barnes: *Brit. Medical Journal,* Jan. 28, 1882; T. More Madden, *The Dublin Jour. of Med. Science,* 1886; P. Mundé, *Gynéc. Trans.,* IV, New York, 1880.

‡ Barnes: *Annals de Gynécologie,* 1883, t. XX, p. 208.

§ Lentz: *Archives de Tocologie,* 1888 (t. VIII, p. 608).

‖ Otte: *Berl. klin. Wochenschrift,* p. 345, 1857.

obturator hernia has been reported by Rust, Chiene, Kiwisch, and Picqué.

Hernia of the ovary (Fig. 27) is not always easily diagnosed. A hernia in the labium majorum has been mistaken for a cyst of

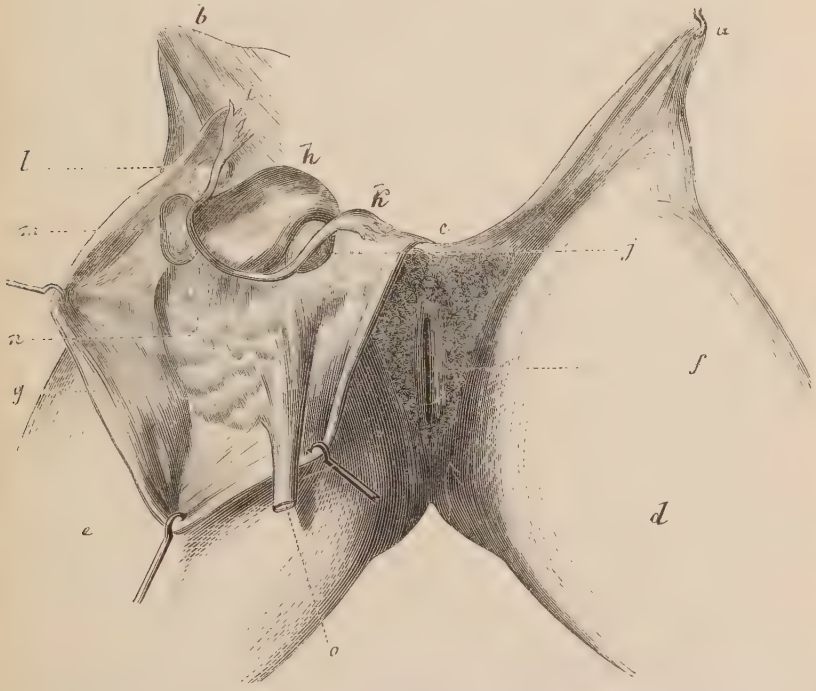

FIG. 27.—FEMORAL HERNIA OF THE OVARY, UTERUS, AND FALLOPIAN TUBE.—(*J. Cloquet.*)

a, b, Abdominal wall; *c,* arch of the pubis; *d, e,* thighs; *f,* vulva; *g,* wall of the hernial sac; *h,* uterus; *i, k,* Fallopian tubes; *j, m,* ovaries; *n,* fatty epiploic sac; *o,* pedicle of the omentum which has been transversely divided.

the lip (Guersant) and for a lipoma (Lücke). In a male pseudo-hermaphrodite, a case of hypospadias, the ovary was mistaken for a testicle. Usually hernia of the ovary is complicated with intestinal hernia or utero-epiplocele; it may be simple or

double; in the latter case sterility is the rule. Chambers recently presented to the London Obstetrical Society a curious case of this nature. Most frequently this hernia coincides with other malformations of the genital organs. The hernia of the ovary which occurs through the canal of Nuck is generally accompanied with hernia of the Fallopian tube.

Before puberty hernias of the ovary are almost always unrecognized, but later they give rise to certain symptoms. At the menstrual period the ovarian hernia may be the seat of pain and swelling; it may even occasion the symptoms of strangulation, and necessitate the surgical operation of inguinal ovariotomy.

Again, *ovarian prolapsus* quite often gives rise to menstrual troubles, amenorrhœa and dysmenorrhœa, serious nervous disorders, hysteria, epilepsy, or insanity, which may require a radical operation—*castration* or *normal ovariotomy*, first performed by Battey, in America, afterwards by Hégar, in Germany, and by Lawson Tait, in England.

The ovary, in these cases of hernia, is not always changed in its anatomical structure or in its function. The cases reported by Wiederstein, Olshausen, Rizzoli, Handy, Beigel, etc., demonstrate that this variety of displacement does not absolutely prevent fecundation, pregnancy, or labor.

5. Congenital Cysts of the Ovary.—Among the congenital cysts of the ovary, some are cystic formations from the Graafian follicles; others are *dermoid cysts*.

The first seem to result from a change in the germination of the ovarian epithelium, which, instead of giving origin to Pflüger's tubes, then to the primary follicles, and finally to the Graafian follicles, forms irregular cavities, having a lining of epithelium; the cavities gradually increase in size by the accumulation of their secreting product in their interior (Malassez, de Sinéty).

Dermoid cysts, on the contrary, according to Wells, who has seen twenty cases in his one thousand ovariotomies, are formed of a thick sac, containing various structures: dermoid tissue, cutaneous tissue with hairs, sebaceous glands, sudorific glands, teeth, cerebral matter, muscular tissue. The development of these curious cysts, the origin of which is still obscure, has been attributed to *fœtal enclosure;* but as they have been met with in small girls, it must be admitted that these cysts have no connection with conception. Are they the result of an enclosure during the embryonic period, according to the theory of Verneuil, which has been recently further developed by Prof. Lannelongue? We do not know.

SECOND ARTICLE.

MALFORMATIONS OF THE FALLOPIAN TUBES.

Congenital malformations of the Fallopian tubes are: their absence, a rudimentary state, an increase in number, displacement or hernia, stricture of their lumen, obliteration, and imperforations of these organs.

1. **Absence of the oviducts** may be either bilateral or unilateral. With this condition the ovary is generally absent, although not necessarily, for the reasons which have already been given.

When the Fallopian tubes are absent and the uterus is found in its normal position, the anomaly is explained by an arrest of development of the superior extremity of Müller's ducts.

2. **Rudimentary State of the Fallopian Tubes.**—The *rudimentary state* of the Fallopian tubes is an imperfect state of these tubes less pronounced than the preceding. Both may arise from the same cause, and usually coincide with a uterine malformation.

3. **Multiplicity of the Fallopian Tubes.**—The *increase* in number of the Fallopian tubes affects only the abdominal extremity of the tube, that is, the pavilion. The multiplicity of the openings into the abdominal cavity, the double or triple pavilions, surrounded with their fringes, which later may

present numerous variations, are well known, since Gustave Richards described them in 1851. A. Doran reported, in 1887, an interesting case of a supernumerary tubular orifice surrounded by a fimbriated extremity.*

The formation of multiple pavilions may be explained by embryology. From the investigations of Balfour and Sedgwick, it is known that the Fallopian tubes come from Müller's ducts. These latter have their origin from the apex of the Wolffian body, in the form of involutions or multiple cul-de-sacs of epithelium from the pleuro-peritoneal cavity, which soon unite to constitute a longitudinal tube, that passes towards the cloaca, and finally is located along the side of the Wolffian canal.

The upper opening remains open and forms the *abdominal orifice*. Therefore if several pleuro-peritoneal involutions remain open, the origin of multiple pavilions and orifices is readily understood.

Meckel has reported several cases of this malformation, in which there were two fimbriated extremities connected together by a permeable duct.

4. Displacements or Hernias of the Fallopian Tubes.—*Displacements* or *hernias* of the Fallopian tubes are quite frequent; but generally they are the result of malformations of the uterus or ovary. The most common displacement of the tube is not caused by, but is accompanied by, displacement of the ovary—the two conditions do not necessarily depend one upon the other. This has previously been explained. Bérard, and more recently Lentz † and Brunner,‡ however, have each reported a case in which only the Fallopian tube was found in the sac of a femoral hernia, the uterus and ovary not being present.

* Doran: *London Obst. Soc.*, May 4, 1887.

† Lentz: *Gaz. méd. de Strasbourg*, 1882.

‡ Brunner: *Beitrage zur klin. Chir.*, Bd. IV, S. 31, 1889.

In a hernia of the Fallopian tube the tube may present different pathological changes. In one case reported by Dolbeau it was cystic; in a case of Böckel's it was accompanied by a cyst of Rosenmüller's organ.

These displacements of the Fallopian tube may be pathological as well as congenital. The pathological displacements result from adhesions in consequence of a pelvic peritonitis,

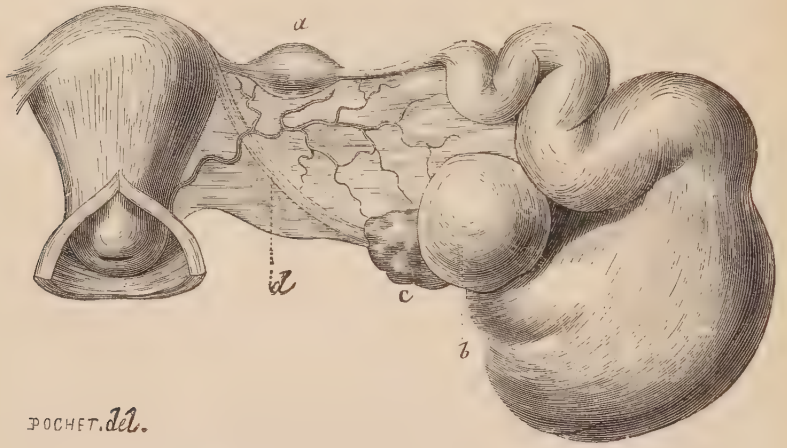

FIG. 28.—ENCYSTED HYDROSALPINX OF THE RIGHT FALLOPIAN TUBE.
a, Ampullar dilatation of the tube; *b*, pavilion; *c*, ovary; *d*, round ligament.

or morbid condition of the uterus, such as flexions, versions, inversions or prolapsus of the womb.

5. Strictures, Obliterations, and Imperforations of the Fallopian Tubes.—*Strictures* and *obliterations* of the tubes may be either congenital or pathological.

This condition may cause the development of *dropsy of the Fallopian tube,—hydrosalpinx* (Fig. 28),—and all its symptoms, which may necessitate the operation of salpingotomy, the recent results of which have been very successful.

Obliterations of the lumen of the Fallopian tube are most often pathological, rather than congenital, and they result from lesions of the neighboring organs (pelvic peritonitis, endometritis, etc.), or primary changes of the duct itself.

Congenital imperforations or closures extend the entire length of the duct, or are located in the pavilion. If it is recalled that Müller's ducts are primarily ducts without a lumen, it is easily understood how this malformation may occur.

THIRD ARTICLE.

MALFORMATIONS OF THE ROUND LIGAMENT.

The round ligament is a fibro-muscular cord, which varies considerably in thickness and length in different women. These variations are not without importance, as they certainly affect the position of the uterus, and since Alexander's operation (shortening of the round ligament) has been accepted for restoring to position a retroversion of the uterus, or elevating a prolapsed uterus, it is important to have the ligament well formed and strong, and not small and rudimentary.

During pregnancy the veins of the round ligament usually become enlarged and varicosed. Madame Boivin and Dugès have reported a case in which a varicosed condition of these veins was so greatly developed that the lesion was mistaken for a femoral hernia.* These changes are certainly not congenital, but are like vascular dilatations, or spontaneous arterial aneurisms, or varicosed dilatations of the veins, which occur in some individuals who seem to have a "varicose diathesis." Uterine pressure, which results from the development of the fœtus, is not always a cause of the lesion, since if the varicosed conditions are common to all women during pregnancy, they are very variable in the majority of pregnant women, and it would appear that a predisposition is necessary for the development of this lesion.

The round ligament may be the seat of tumors,—myomas,

* Madame Boivin et Dugès: *Traité des maladies de l'utérus*, Paris, 1842.

fibro-myomas,—which were first described by Duplay, and later by Sänger. These tumors are not congenital.

Intra-peritoneal hydrocele of the round ligament. According to some writers, this hydrocele is developed from the remains of the canal of Nuck, which surrounds the round ligament during fœtal life; others think that the canal of Nuck does not exist, and that the hydroceles, in women, are serous cysts developed from the dartos sac, from hygromas of the labia majora, or from hydroceles of old hernia sacs (S. Duplay).

Zuckerkandl found the canal of Nuck to be present four times in examining nineteen children, twelve years old. Camper and Cruveilhier, also Ramonède, have met with it in old women. The presence of this canal predisposes to inguinal hernias. Richelot,* Staffel†, and Ingersoll‡ have recently called attention to hydrocele in women who have the canal of Nuck patulous.

* Richelot: *Union médicale*, Oct. 2, 1890.
† Staffel: *Ann. de Gyn.*, t. XXVIII, p. 307, 1887.
‡ Ingersoll: *Am. Jour. of Obst.*, p. 427, 1882.

FOURTH ARTICLE.

MALFORMATIONS OF THE BROAD LIGAMENTS.

Peri-uterine abscesses, pelvic peritonitis, pelvic cellulitis, peri-uterine hæmatoceles, and extra-uterine pregnancy developed in the broad ligament are not here described; first, since they are not congenital lesions; and, second, they are not developed from retrograde embryonic organs.

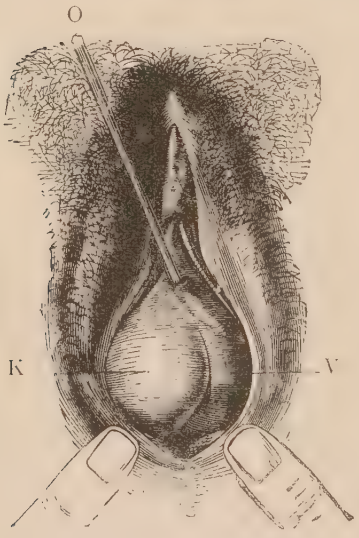

FIG. 29.—CYST OF THE VAGINA. *V*, Vagina; *K*, cyst; *O*, sound introduced into the urethra.

Cysts of the broad ligament, called **parovarian cysts,** are developed in the structure of the broad ligament. These tumors are retention cysts, developed in the remains of the canaliculi of Rosenmüller's body (canaliculi of Kobelt) or parovarium. Later it will be seen that from the remains of the excretory canal of Rosenmüller's body, Gärtner's canal, may be developed other cystic tumors, named *paravaginal cysts* (Fig. 29).

Cysts of the parovarium are not infrequent, since Olshausen met with them thirty-two times in two hundred and eighty-four ovariotomies.

FIFTH ARTICLE.

MALFORMATIONS OF THE UTERUS.

The uterus, we know, is developed from Müller's ducts, so that if one of these ducts is wanting, or is atrophied, or their fusion does not take place or is incomplete, there follow

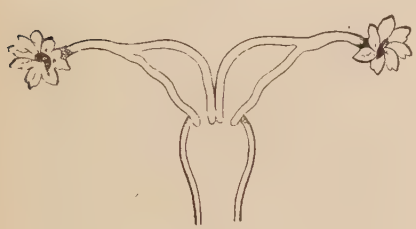

Fig. 30.

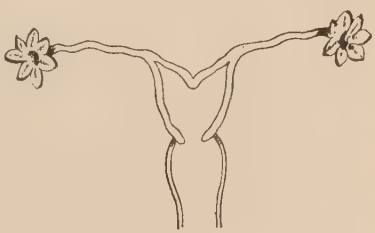

Fig. 31.

Fig. 32.

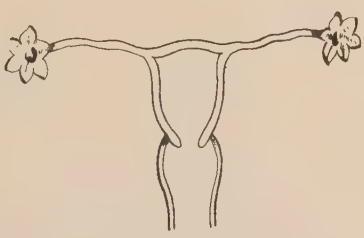

Fig. 33.

Malformations of the Uterus (Arrest of Development).
Fig. 30, Double uterus; Fig. 31, bilocular uterus; Fig. 32, bicornous uterus; Fig. 33, simple uterus, normal uterus.

the different varieties of uterine malformations (Fig. 30 to 33). The special origin of each malformation will be described later.

The following malformations will be studied: absence of

the uterus, fœtal uterus, infantile uterus, pubescent uterus, imperforation and atresia of the neck of the uterus, atrophy and hypertrophy of the uterus, abnormal positions of the uterus, double uterus, transverse incomplete partitioning of the uterus, etc.

1. Absence of the Uterus; Rudimentary Uterus.—*Complete absence* of the uterus is extremely rare. The cases reported are somewhat doubtful, and many writers deny the existence of this malformation.

From a functional and physiological consideration, it may be said that the positive absence of the uterus occurs. But a careful examination, in these cases, always demonstrates that, from an anatomical standpoint, the uterus is not entirely wanting. It is represented, at times, by a simple muscular cord, solid or channelled by a small cavity; or by a small band extending between the two Fallopian tubes. A careful examination finds in these cases a *rudimentary uterus.*

Absence of the uterus coincides with absence or atrophy of the vagina and Fallopian tubes; also absence or atrophy of the ovaries; but a vagina, Fallopian tubes, and perfectly formed ovaries may also exist with this malformation. Generally the external genital organs are perfectly formed, and nothing in their appearance would indicate the absence of the uterus.

In these cases ovulation takes place, but it is not accompanied with the usual monthly hæmorrhage. Menstruation may be replaced by supplementary hæmorrhages. L. Le Fort has reported a case (autopsy by Calori) of an Italian woman, twenty-three years old; the vagina was well formed. S. Pozzi, Mundé, and Max Strauch have each reported similar cases, so that this condition undoubtedly exists.

Women who present this condition have nothing to indicate their malformation. The figure, the voice, the psychological characters, are those of a perfect woman. Many marry, not-

withstanding this malformation, which is only recognized later. When the vagina is rudimentary, sexual connection is practised by pushing in the vulva or canal of the vestibule, thus forming a cul-de-sac sufficiently deep to serve as a vagina; at other times, the urethra is dilated and does duty as a vagina.

This anomaly would seem at times to be hereditary. It has been met with in several sisters, whose maternal aunts had never menstruated and who remained sterile.

Women who have no uterus are always sterile, and there is no remedy for their physiological condition.

The diagnosis of atrophy of the uterus may be made by abdominal palpation with rectal and vesical touch.

This examination should always be made in young girls who do not menstruate and who differ from other women; since the absence of the uterus, in our opinion, should be considered a cause for divorce.

Dr. Balade has recently reported a very curious case of absence of the uterus and vagina.*

He writes: "In 1886, I was called to see a patient, age eighteen years. The mother said the health of her daughter gave her some anxiety; for three months Dr. X. has had her under treatment; she has the appearance of good health, but she has never menstruated; notwithstanding she has taken large doses of iron and quinine, and I have, also, attended to her diet, yet she remains anæmic.

"Mademoiselle X. is a beautiful young girl, brunette, well formed, the conjunctiva is not pale, she presents all the external appearances of good health and complains of no pain.

"Examination of the heart, blood-vessels, and lungs gives no indication of any lesion; the mammæ are well developed; the hair is normal; the external figure is that of a well-formed

* Communication made to the Anatomical and Physiological Society of Bordeaux at the meeting on July 27, 1891, and *Journal de médecine de Bordeaux*, Oct. 4, 1891.

woman; abdominal palpation reveals nothing; the belly is supple, not painful at any point, no swelling. Wishing to make a vaginal examination, it was found that the end of the index finger could scarcely be introduced into the vagina. Further examination shows that the appearance of the external organs of generation is absolutely normal; the labia majora are well formed; the clitoris of the usual size; the labia minora are normal; the urinary meatus is in its proper place. There is seen no trace of the hymen, only a resisting partition, which may be slightly depressed at the place of the vaginal opening. A catheter may be passed without any difficulty; the urethra is not dilated and the urine is normal. With a sound in the bladder rectal touch is practised.

"When the finger is placed in contact with the end of the sound, it is found that there is not more than two millimetres of thickness of tissue between them, and as high up as the finger can be passed there is found neither vagina, uterus, nor any trace of these organs.

"The right index finger placed in the center of the partition, and the left finger passed into the rectum, it is found that they are separated by a thickness of only three to four millimetres of tissue.

"Examination of the external inguinal canals: there is found neither swelling nor any special painful sensation; also by a more careful examination of the abdomen, and exercising deeper pressure, there is found no trace of the uterus or annexes, neither in the right nor left side. From this examination it was decided that Mademoiselle X. has neither uterus nor vagina.

"The health of Mademoiselle X. was excellent, and there was no indication for medical or surgical treatment.

"Upon questioning the parents of the girl, the father gave a history of good health, but the mother suffered with a lesion of the genito-urinary passage. At her first labor, twenty-two years ago, she had some difficulty, which necessitated the use

of the forceps, there resulting a large vesico-vaginal fistula, which has never been treated and it still exists. Three years after her first labor, she again became pregnant and gave birth to Mademoiselle X.

"The father asked my opinion in regard to permitting his daughter to marry. I replied that he could marry his daughter, but that the marriage would remain childless. One of the objects of marriage is certainly procreation, but happiness and support for two is also another. Or why should women who have passed the menopause marry?

"In this case, or in analogous cases, sexual connection may be superficially accomplished; since, from many observations, it is well known that these rudimentary vaginas in time become sufficiently enlarged so as to permit, with satisfaction to both parties, the performance of the sexual act.

"Mademoiselle X. has never married, and still retains good health. She has never had any trouble with the organs of generation."

2. Fœtal Uterus, Infantile Uterus, Pubescent Uterus, Imperforate Uterus.—Naturally by the side of cases of absence of the uterus may be placed those cases in which this organ, having the normal appearance, has, however, undergone partial or complete arrest in development.

The *fœtal uterus* is one in which the shape is normal, but the organ remains stationary and has the appearance and dimensions that it had at the time of birth. J. Cloquet reports a remarkable case of this kind, in a woman twenty-two years of age, but who had the Fallopian tubes and ovaries of a normal woman.

Between the *fœtal uterus* and the *infantile uterus* it is only a question of words.

The *pubescent uterus* also is only the continuation of a transitory evolution state, with the simple difference that the arrest

of development supervenes at a later period—at a time between girlhood and puberty. Generally this anomaly is accompanied with poorly developed external genital organs and aborted mammæ.

The physiological results of this condition are sterility and various menstrual troubles, none of which are pathognomonic; for if amenorrhœa is present, it may have only the symptoms of difficult menstruation. A correct diagnosis in cases of pubescent uterus is very desirable, since this arrest of development, according to Puech, is not positively incurable.

It is believed by some writers that the proper treatment is to strengthen the general organism, which may cause the aborted uterus to develop, and among the remedies they place sexual connection, believing it will assist in the development of the uterine system.

In a patient of Charcot's who died in the Salpêtrière there was found at the autopsy a perfect muscular uterus, without any trace of a central cavity; the os uteri, however, was perforated, but the Fallopian tubes were closed. The ovaries were found to be normal, covered with menstrual cicatrices; yet this woman, very lascivious, had never menstruated. Naturally ardent and unsatiated, she had acquired the symptoms of extreme hysteria, and her nights were troubled with voluptuous and lascivious dreams.*

3. Imperforation and Atresia of the Neck of the Uterus.—*Congenital imperforation of the neck of the uterus* most often coincides with other malformations of the genital canal, as double uterus and vagina. It is complete, extending the entire length of the cervical canal, or it may be located either at the internal orifice or external orifice of the neck. Meredith, Dubreuil, Chiarleoni, Griffith, etc., have reported cases of this

* Charcot: *Soc. anatomique*, 26 mars, 1880.

nature. Fleetwood Churchill* has reported two cases which were treated with success.

Congenital atresia of the neck of the uterus is a similar condition, but less marked than imperforation.

Atresia occasions painful dysmenorrhœa and sterility. Gradual dilatation may relieve this condition, and should always be resorted to, since, in time, this anomaly may cause a hæmatoma of the uterus or of the Fallopian tube.

Obliteration is the more serious. It may cause the retention of the menstrual fluid in the uterus, so distending it as to form, in time, a pelvic-abdominal tumor, which may resemble a pregnancy. The blood and transuded fluids from the mucous membrane pass into the Fallopian tubes and give rise to hæmatosalpinx. The tube may rupture; the blood may pass from the pavilion into the peritoneal cavity, and form a peri-uterine or pelvic hæmatocele.

The only treatment for this grave malformation is puncture, followed by antiseptic injections. A glass or rubber tube is retained in the opening for a certain time. It is not to be forgotten that the puncture may occasion complications, especially pyometra.

Obliteration of the neck of the uterus determines certain symptoms when puberty is reached. Seldom before this period is the malformation suspected. The diagnosis may easily be made in these cases. There is absence of menstruation; periodical pains, which correspond to the amenorrhœa, and a gradually increasing tumor of the pelvic abdomen.

In the case of a double uterus, the uterine hæmatoma may be unilateral.

4. Atrophy and Hypertrophy of the Uterus.—*Congenital atrophy* of the uterus may be mistaken for a pubescent uterus.

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* Fleetwood Churchill: *Maladies des femmes*, Paris, 1881.

This anomaly is an arrest in the evolution of the uterus, which frequently corresponds to an arrest of development of the entire organism, as sometimes seen in young girls, who at twenty years of age have the appearance of a girl not yet past puberty; or there may be a partial arrest of development restricted to the pelvic region.

Congenital hypertrophy is complete or partial; involving

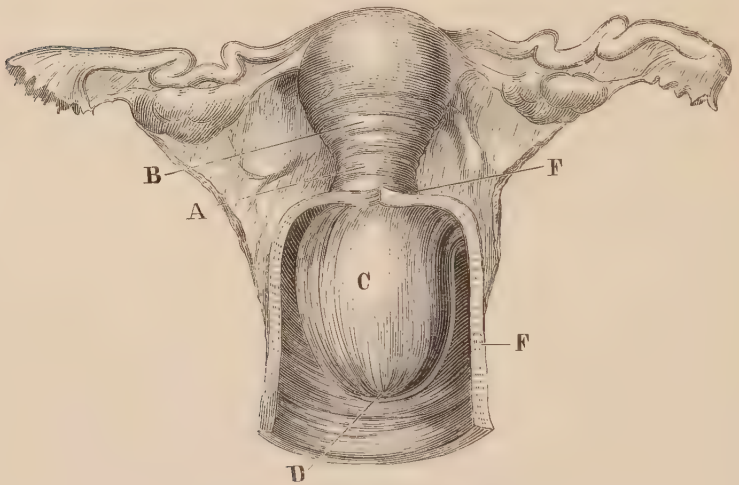

Fig. 34.—Uterus with Subvaginal Hypertrophy of the Neck.

A, Subvaginal or pelvic portion of the neck; *B*, body of the uterus; *C*, vaginal portion of the hypertrophied body; *D*, mouth of the uterus; *F*, *F*, wall of the vagina which has been opened anteriorly.

either the entire organ, or only the body or the neck (Fig. 34). In the malformations of the neck the body of the uterus of an adult woman may only have the dimensions of that of a new-born child. The neck is elongated and cylindrical (Fig. 35), or conical (Fig. 36), at other times tapiroid,* due to an enlargement of the anterior lip. It may fill the vagina and pro-

* Resembling the snout of a tapir.—Tr.

ject from the vulva, when it resembles a prolapsus of the uterus (Fig. 37). Stenosis of the os uteri very often accompanies this malformation of enlargement of the neck; also dysmenorrhœa and dysuria.

This precocious and exaggerated development of the uterus is often accompanied with a premature development of the

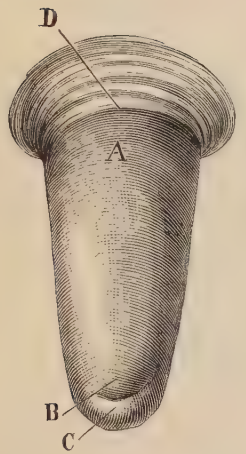

FIG. 35.—HYPERTROPHIC ELONGATION OF THE NECK OF THE UTERUS.

A, Neck of the uterus; *B*, anterior lip, and *C*, posterior lip of the mouth of the uterus; *D*, insertion of the neck to the uterus.

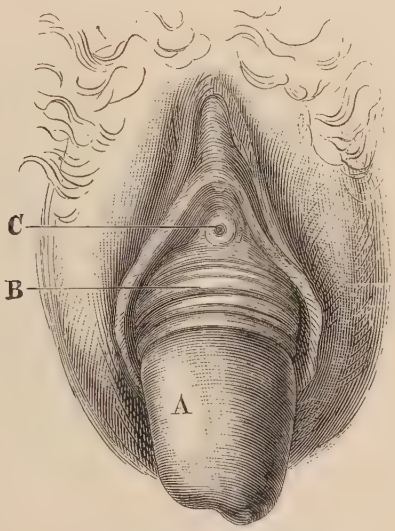

FIG. 36.—SUBVAGINAL HYPERTROPHY OF THE NECK OF THE UTERUS

A, Neck of the uterus; *B*, body of the uterus; *C*, urinary meatus (vulvar orifice of the canal of the urethra).

external organs of generation, of the mammæ, and also with precocious menstruation.

In a case reported by Kussmaul, the child menstruated at two years of age, became pregnant when eight years old and the labor terminated normally.

Hypertrophy of the neck of the uterus may be considered from its functional point of view. Among the obstacles to fecundation, besides uterine displacements, uterine catarrh, and stricture of the os uteri, Pajot has strongly insisted that enlargement of the neck—the conical shape, and especially the peg-

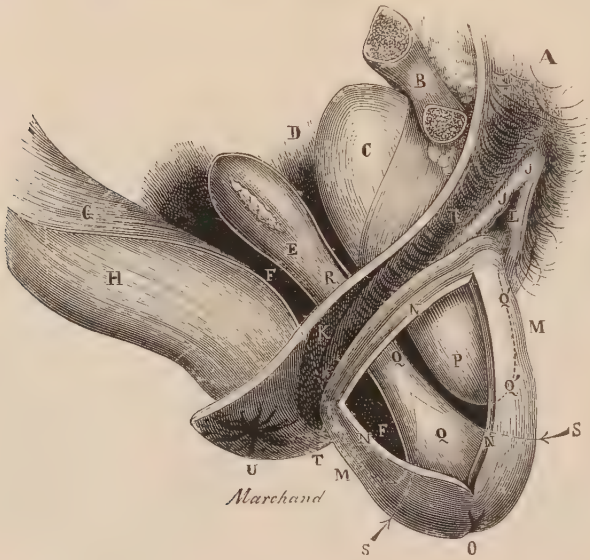

FIG. 37.—ANTERO-POSTERIOR SECTION OF THE PELVIS IN A CASE OF HYPERTROPHIC ELONGATION OF THE SUBVAGINAL PORTION OF THE NECK OF THE UTERUS.

A, Mons veneris; *B*, sawed right pubic bone; *C*, bladder; *D*, cul-de-sac of the uterus; *E*, uterus; *F*, utero-rectal cul-de-sac; *G*, utero-rectal peritoneum; *H*, rectum; *I*, right labium majorum; *J*, right labium minorum; *K*, genito-crural fold; *L*, urinary meatus; *M*, walls of the vagina; *N*, wall of the opening made in the vagina; *O*, mouth of the uterus; *P*, bas-fond of the bladder; *Q*, subvaginal portion of the hypertrophied neck; *R*, body of the uterus; *S*, line of amputation of the neck; *T*, perineum; *U*, anus.

top form—may play an important rôle.* If it may be said that twenty-five times in a hundred sterility is the man's fault (Pajot), there then remains seventy-five per cent. in which women are at fault.

* Pajot: *Ann. de Gynécologie*, t. XXV, p. 255.

5. Abnormal Positions of the Uterus.—Among *abnormal positions* of the uterus the following displacements are not included: *anteversion* (Fig. 38); *anteflexion* (Fig. 39); *retroversion* (Fig. 40); *retroflexion* (Fig. 41); *prolapsus* (Fig. 42); etc.

These positions are almost always acquired; they are the result of pathological changes, or they are due to pregnancy.

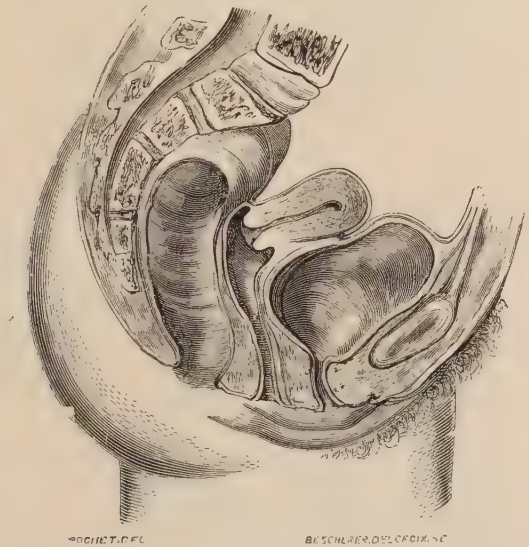

FIG. 38.—ANTEVERSION OF THE UTERUS.

When a woman is pregnant, this lesion seldom occurs; it is only met with in cases where the uterus has nearly its normal size, and it is still in the cavity of the pelvis. There are, moreover, several circumstances which prevent displacement in women. Situated near the superior strait, the uterus, anteriorly, lies against the bladder, and, posteriorly, it is in contact with the rectum. The oblique direction of the pelvis favors anteversion, which is, however, prevented by the

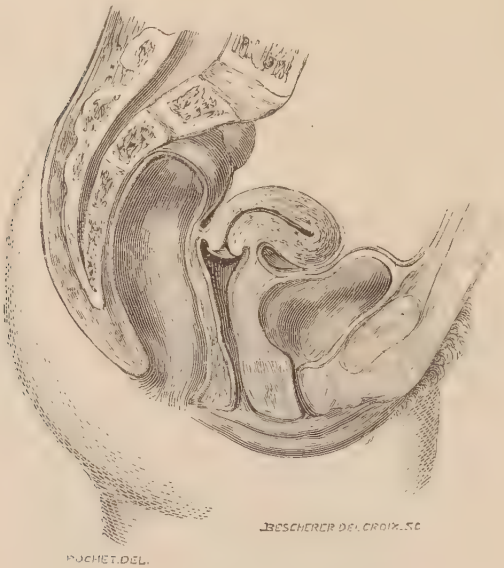

FIG. 39.—ANTEFLEXION OF THE UTERUS.

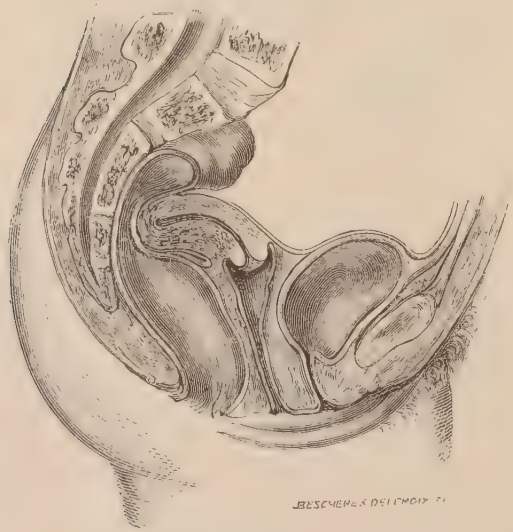

FIG. 40.—RETROVERSION OF THE UTERUS.

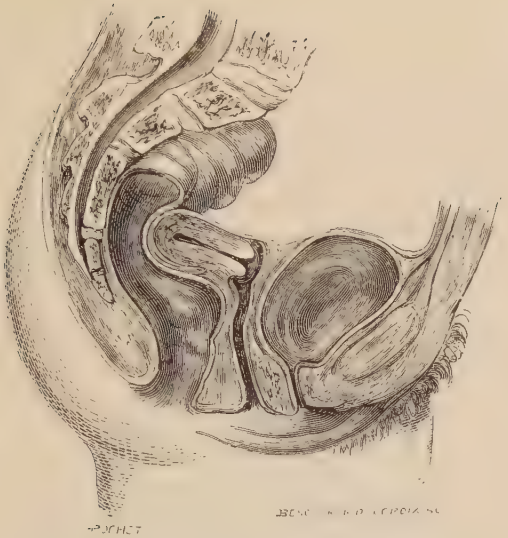

FIG. 41.—RETROFLEXION OF THE UTERUS.

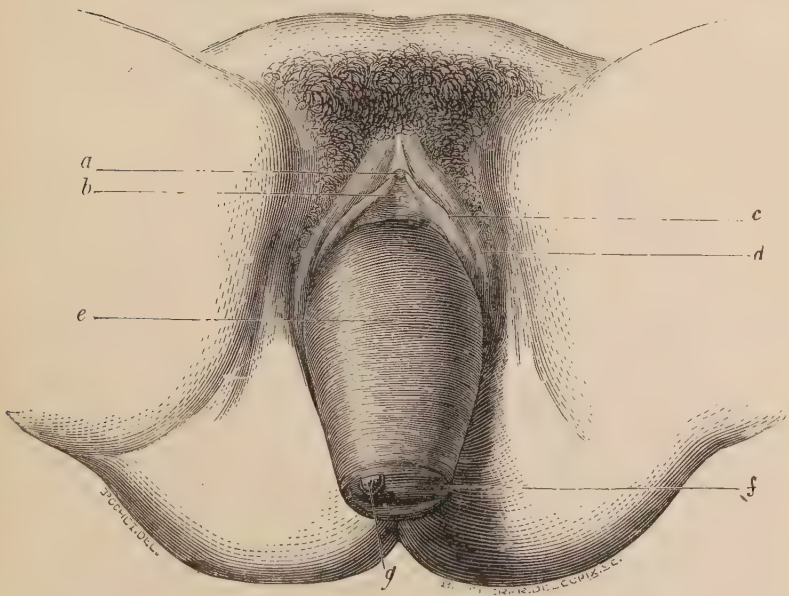

FIG. 42.—COMPLETE PROLAPSUS OF THE UTERUS.

a, Clitoris; *b*, urinary meatus; *c*, labium minorum; *d*, labium majorum; *e*, prolapsed uterus; *f*, anterior lip, and *g*, posterior lip of the mouth of the uterus.

bladder, often distended, and the reflection of the peritoneum from one organ to the other. When the bladder contains a large amount of urine, anteversion is impossible. If this form of displacement does take place (Figs. 43 and 44), the fundus of the uterus reaches anteriorly as far as the symphysis pubis, and presses upon the neck of the bladder; the neck of the uterus, posteriorly, lies against the rectum, so that the organ, instead of lying nearly perpendicular, is found to be transverse.

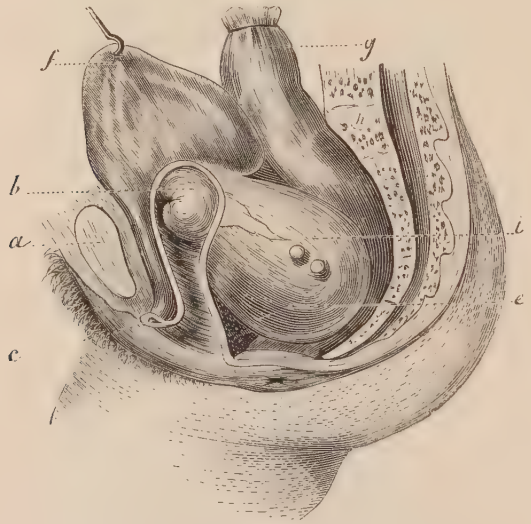

FIG. 43.—RETROVERSION OF THE UTERUS DURING THE EARLY PERIOD OF PREGNANCY.

a, Pubis; *b*, neck of the uterus at the bottom of the vagina; *c*, urinary meatus; *e*, body of the uterus; *f*, bladder drawn up with a hook; *g*, rectum; *h*, sacral vertebral angle; *i*, section of the round ligament.

Other displacements of the uterus, called *hysterocele*, and abnormal orifices, *uterine fistulæ*, will not be described.

If these conditions are congenital, they then coincide with serious anomalies of the organism, and are classed among the monstrosities.

There is, however, a congenital position of the uterus which comes from a localized arrest of development. This anomalous position is called *congenital oblique and latero-position of the uterus.* It is the result of a true asymmetry of the uterus, in which one half of the organ is larger than the other half, and there is, also, a distortion of the uterus, which inclines it to the

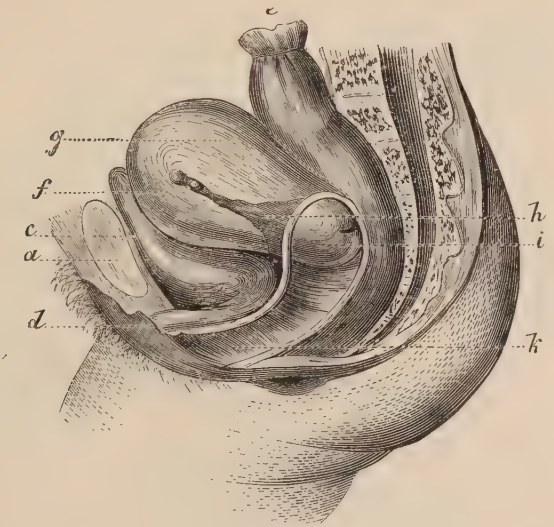

FIG. 44.—SECTION OF PELVIS IN PROFILE, REPRESENTING ANTEVERSION OF THE UTERUS.

a, Pubis; *c*, bladder; *d*, urethra; *e*, rectum; *f*, uterus; *g*, body of the uterus; *h*, hilus of the uterus; *i*, mouth of the uterus; *k*, vagina.—(*Boivin and Dugés.*)

over-developed side, a latero-version. In these cases the round ligament is shorter, on the affected side. This malformation is liable to be mistaken for a unicornous uterus.

6. Double Uterus.—The two Müller's ducts, as previously mentioned, are united together by fusion and form a single tube, constituting the uterus and vagina. If this fusion does

not take place, and Müller's ducts undergo their normal evolution, there results a double uterus and vagina. If the fusion is incomplete or delayed, there may occur the several varieties, from the perfect double uterus, to the simple indented uterus. The explanation of these malformations is that the union by fusion of Müller's ducts does not follow a normal course.

All cases of this malformation characterized by one half of the uterus being fully developed, while the other half remains

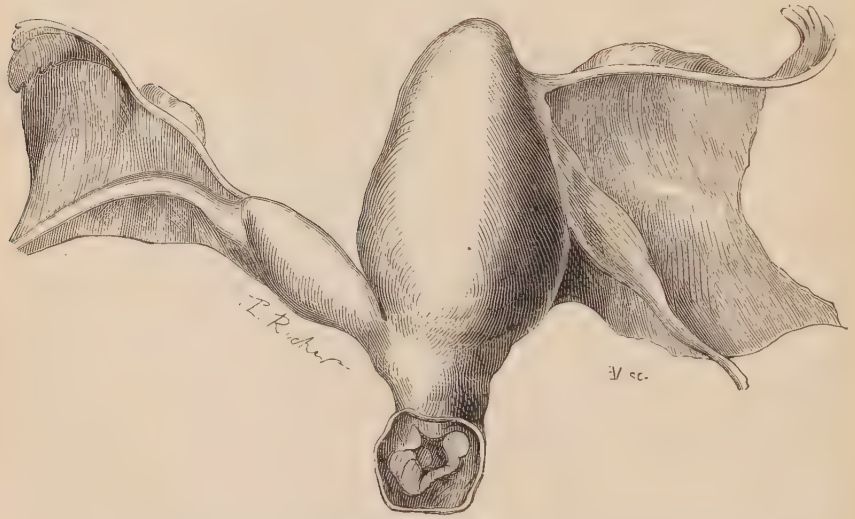

FIG. 45.—DOUBLE UTERUS OF WHICH ONLY ONE OF THE TWO CAVITIES IS REGULARLY DEVELOPED, THE OTHER REMAINING IN A RUDIMENTARY STATE.—(*Huguier.*)

rudimentary (Fig. 45), form a second group of malformations, in which one of the two Müller's ducts is much more developed than the other.

Special names have been given to each of these varieties; although, in truth, they are only different degrees of the same teratological condition. The names *unicornous*, *bicornous*, *cor-*

diformis, *semi-partitus* or *bilocular*, *bi-partitus*, *duplex* or *didelpha*, *parvicollis*, *deficiens*, etc., correspond evidently to special cases, but having, undoubtedly, only one etiological origin, which may be divided into two principal groups: one dependent upon a defect in the fusion of Müller's ducts; and the

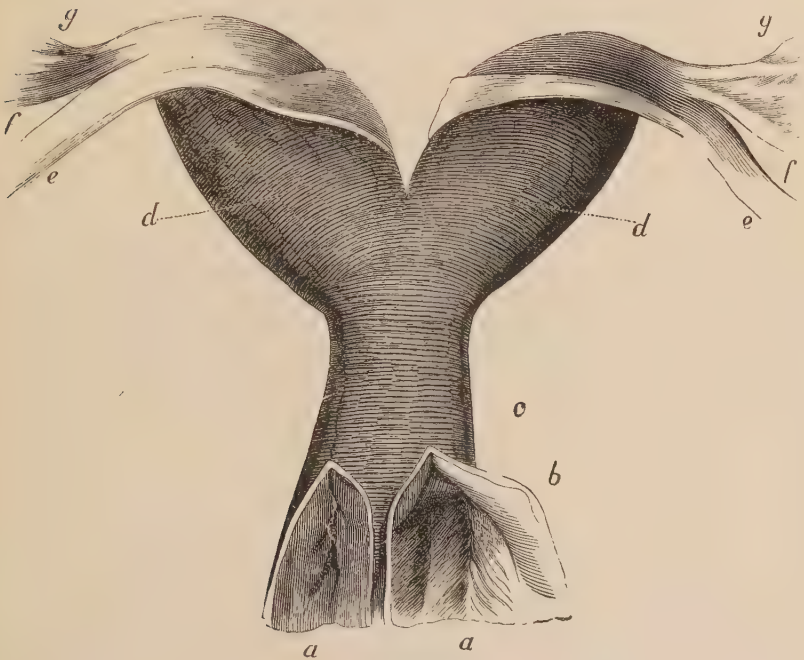

FIG. 46.—BICORNOUS UTERUS WITH DOUBLE VAGINA, IN A GIRL SEVENTEEN YEARS OLD.

a, *a*, The two opened vaginas; *b*, orifice of the left uterus; *c*, the two adjoining cervical portions; *d*, *d*, the two uterine cornua; *e*, *e*, round ligaments; *f*, *f*, the oviducts; *g*, *g*, the ovaries.

other dependent upon the synchronous defect in the evolution of these ducts.

1. *Bicornous Uterus.*—In this variety the uterus is divided into two cornua, at its fundus (Fig. 46); or simply indented,

as met with in many of the lower animals—Rodents, Carnivora, Ruminants.

Generally the left cornu is directed forward, and frequently there is found a band which passes between the two cornua and extends from the bladder to the rectum (Fig. 47). This band seems to be the cause of the anomaly. The two cornua are seldom of equal size. All the transitions between a bicornous and unicornous uterus are met with.

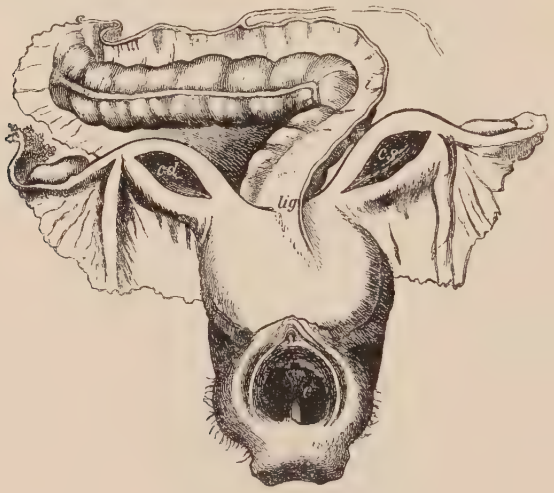

FIG. 47.—BICORNOUS UTERUS WITH THE VESICO-RECTAL LIGAMENTS VERY DISTINCT.

cd, Right cornu; *cs*, left cornu of the uterus; *lig*, vesico-rectal ligament; *e*, vagina.

In these malformations the external genital organs are usually normal in their development. Menstruation may take place from both cornua. Henderson, in 1883, reported the case of a woman who was pregnant on one side and, at the same time, menstruated from the other side.

Pregnancy may follow a regular course (Fig. 48). There

have been reported cases of twin pregnancies, with a fœtus in each cornu, or the two fœtuses were in the same cornu.

A single pregnancy in a double uterus is very liable to abortion (Bayard), and a double pregnancy may occasion a rupture of the partition (West, Ollivier), and even the more serious accident, a rupture of the uterus (Depaul, Gallard, etc.).

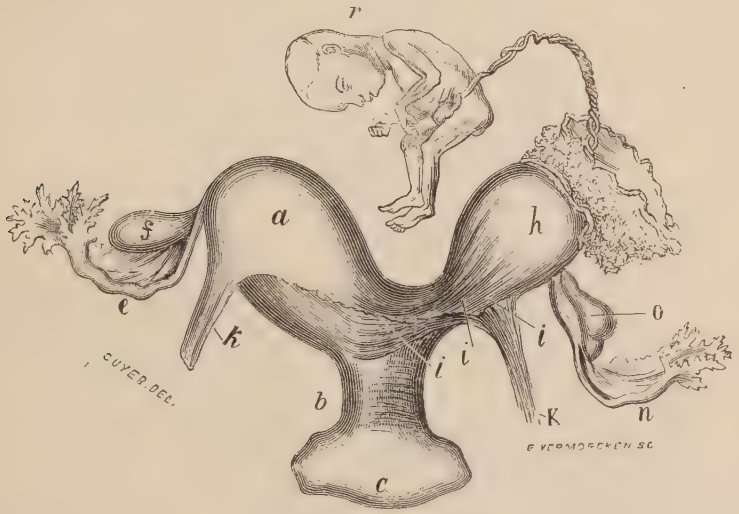

FIG. 48.—PREGNANCY IN A BICORNOUS UTERUS, MISTAKEN FOR A TUBULAR PREGNANCY.

a, Right uterine cornu; *b*, neck of the uterus; *c*, vagina; *e*, Fallopian tube; *f*, ovary; *h*, left uterine cornu; *i*, *i*, uterine peritoneum; *k*, *k*, round ligaments of the uterus; *n*, left Fallopian tube; *o*, left ovary; *r*, fœtus.

The *bicornous uterus* in Fig. 49 is a drawing of the uterus of a woman who was pregnant and passed through labor ten times.

2. *Bilocular Uterus* (*Uterus Septus, Uterus Subseptus*).—In this variety the uterus appears single; its exterior appearance is normal, but its cavity is divided by a partition into two complete compartments (*uterus septus, bi-partitus*); or incomplete compartments (*uterus subseptus*) (Figs. 50 and 51). In the first case the median partition divides the uterus its entire

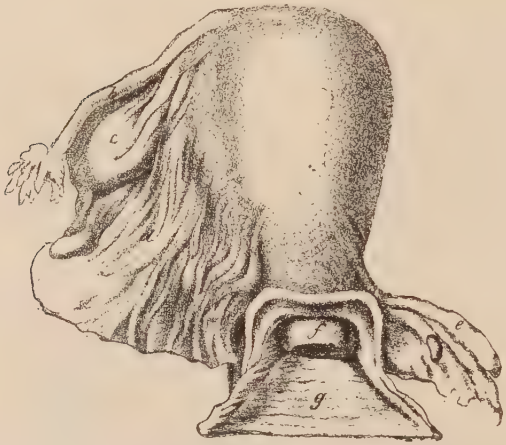

FIG. 49.—BICORNOUS UTERUS OF A WOMAN WHO WAS DELIVERED TEN TIMES.

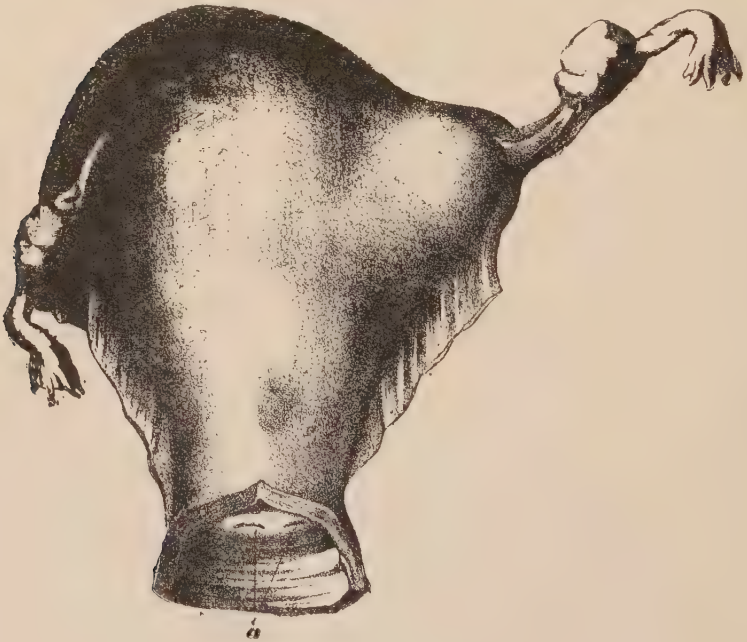

FIG. 50.—BILOCULAR UTERUS WITH DOUBLE VAGINA.

length; while in the second it does not descend far enough to divide the neck of the uterus into two cavities (Fig. 52). The uterus septus has two necks; the uterus subseptus has only one neck.

In some cases one of the two cavities is very much less developed than the other, and there may be a condition of atresia, which may cause the formation of a hæmatocele.

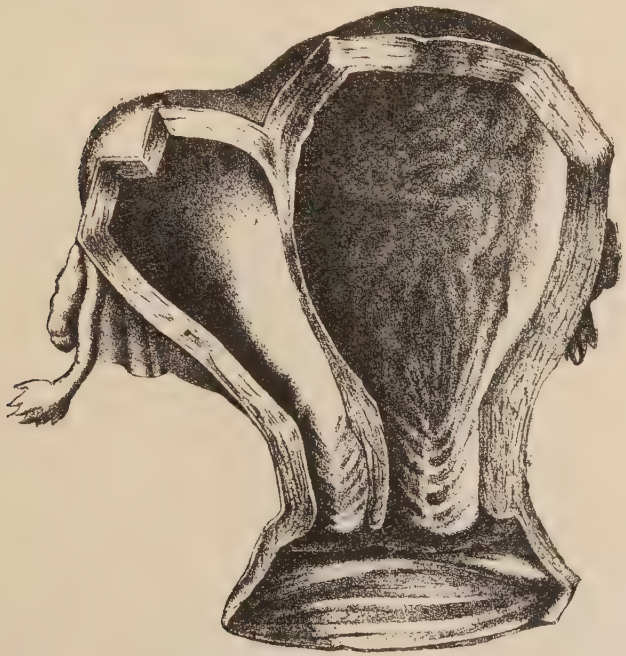

FIG. 51.—UTERUS REPRESENTED IN FIG. 50, OPENED TO SHOW THE PARTITION WHICH SEPARATES IT INTO TWO PARTS.

The bilocular uterus is not very rare. Cassan has collected twenty-one cases. In 1888 I saw a very good specimen (Fig. 53) in a new-born child, otherwise well formed, except a double ureter on each side.*

* Ch. Debierre: *Bull. de la Soc. anatomique*, p. 511, 1889.

3. *Uterus duplex* is truly a double uterus (Fig. 54); each segment has the appearance of a perfect unicornous uterus, more or less fused to its neighbor.

For a time it was thought that this malformation, which is normal among the Marsupialia, was only met with in non-viable monsters. However, it is seen in cases coincident with exstrophia of the bladder, atresia of the anus, and persistence of the cloaca. The duplex uterus is met with in women who are otherwise perfectly formed.

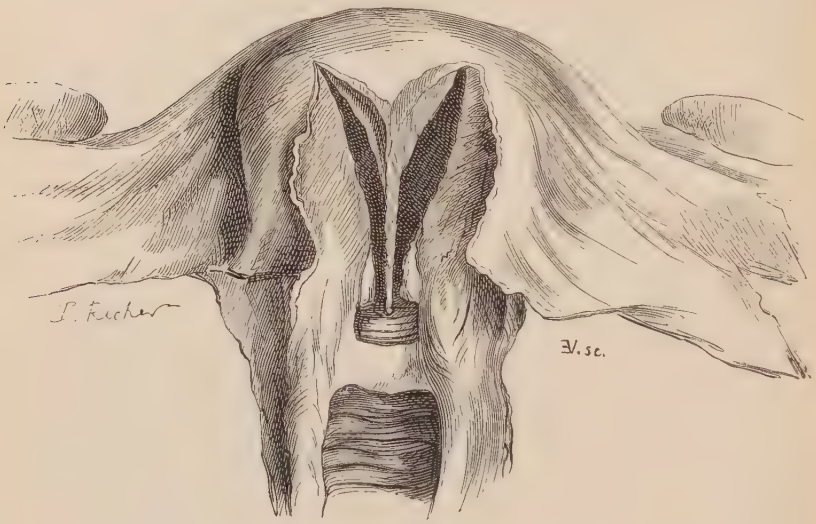

FIG. 52.—EXTERNALLY A SIMPLE UTERUS, BUT INTERNALLY DIVIDED BY A VERTICAL PARTITION INTO TWO DISTINCT CAVITIES.—(*Huguier.*)

Curious cases of this nature have been reported by Ollivier, in 1872, and by Heitzmann, in 1883. Ollivier's case was that of a woman, forty-two years old, who had had six children. Heitzmann's case (Fig. 55) was that of a young girl, twenty-three years old. Both of these women had also a double vagina. In these cases there were two distinct uteri, each

having a single Fallopian tube, a single ovary, and a single round ligament. This malformation was the result of the independent development of the two Müller's ducts.

Queirel* has reported a singular case of a new-born female child, in whom the external appearance was that of a boy; she

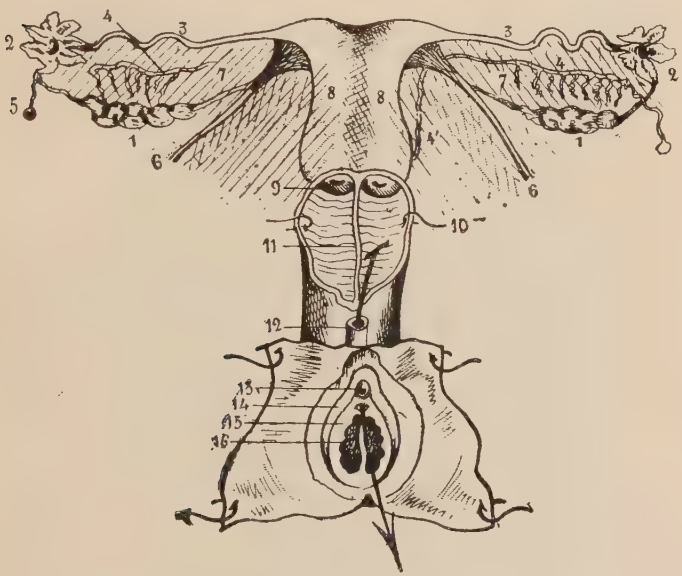

FIG. 53.—GENITAL ORGANS OF A SMALL GIRL. DOUBLE UTERUS, DOUBLE VAGINA, DOUBLE HYMEN.—(*Anatomical Institute of Lille.*)

1, Ovary; 2, pavilion of the Fallopian tube; 3, Fallopian tube, oviduct; 4, Rosenmüller's organ, parovarium; 5, hydatid pedicle of the Fallopian tube; 6, round ligament of the uterus; 7, broad ligament; 8, 8, the two uteri, with 9, their mouths opening each into the two vaginas, 10 and 11; 12, canal of the uterus, into which is passed an arrow; 13, urinary meatus; 14, labia minora; 15, vestibule of the vulva; 16, double hymen.

had two distinct uteri, each having its Fallopian tube, ovary, and round ligament. The penis, through which ran the urethra, lay upon two cutaneous folds, united at the median line; they resembled an empty scrotum, and in its canal emptied

* Queirel: *Ann. de Gynécologie*, t. XXXI, p. 262, 1889.

the two vaginas. There was also present an imperforate anus. This case may be explained as follows: (1) Abnormal union (in the female of the genital folds); (2) enlargement of

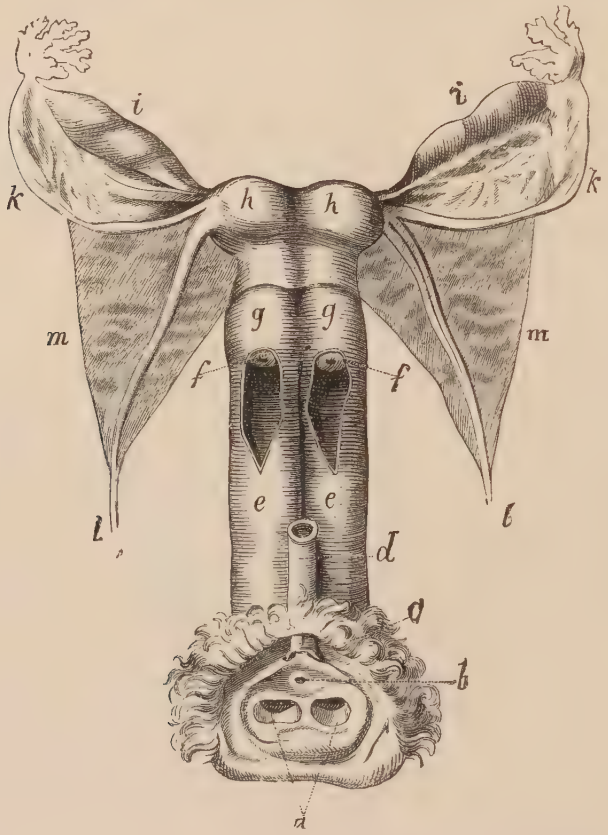

FIG. 54.—DOUBLE UTERUS AND VAGINA IN A GIRL NINETEEN YEARS OLD.

a, The two hymens; *b*, urinary meatus; *c*, labia majora; *d*, urethral canal; *e*, *e*, the two vaginas; *f*, *f*, the two uterine necks; *g*, *g*, the two uteri; *h*, *h*, the two bas-fonds of the uteri; *i*, *i*, the two ovaries; *k*, *k*, the two Fallopian tubes; *l*, *l*, the two round ligaments; *m*, *m*, the two broad ligaments.

the genital tubercle; (3) absence of the development of the ectodermic involution (external cloaca), which, with the posterior extremity of the intestine, forms the anal canal.

7. Double External Orifice of the Neck of the Uterus.—*Double external orifice of the neck* (*uterus bijoris*) is an os uteri having two orifices; it may exist without any partition in the genital canal. This condition is normal with the Sloth and Ant-eater.

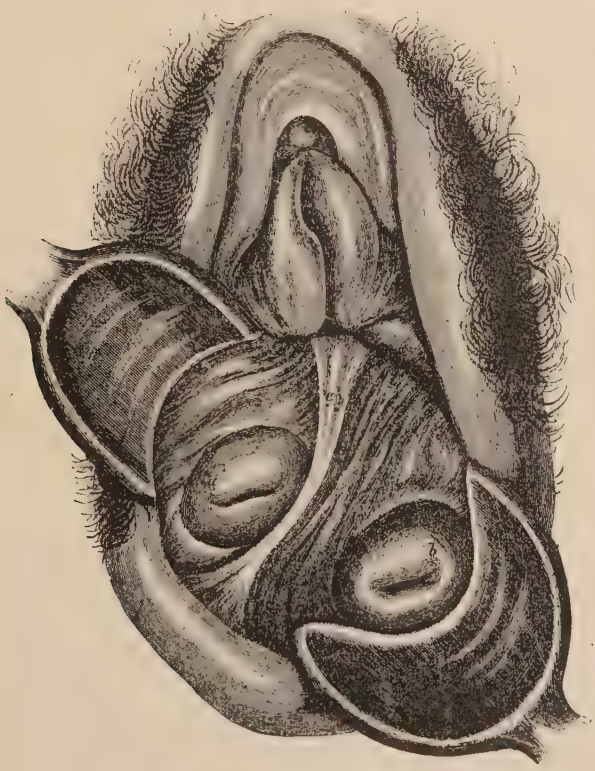

Fig. 55.—Double Uterus, Vagina Much Dilated.—(*After Heitzmann.*)

When this malformation is present, it should be recognized at the time of labor, as it may be a cause of dystocia.

8. Incomplete Transverse Division of the Neck of the Uterus.—Breisky, P. Müller, and later Bidder, P. Budin, E.

Blanc, and Trachet* have reported cases of a singular malformation of the neck, which consists in the presence of a fold, a kind of valve, a diaphragm, projecting into the cavity of the neck of the uterus, and which may become an obstacle to the delivery of the child.

Guéniot† reports a case of dystocia in which a congenital transverse partition of the inferior part of the uterus, separating the cavity of the body from that of the neck, had caused a shoulder presentation and death of the child.

9. Communication of the Uterus with the Neighboring Cavities.—There have been described rare cases of abnormal and congenital communication of the uterine cavity with the bladder, with the rectum, or simultaneously with both cavities.

This malformation is explained by the persistence of the transitory state, in which Müller's ducts empty with the urachus and rectum into the cloaca. When this division is not made, and there is a failure of the partitioning into two separate cavities, there results the abnormal communication of the cavities.

It is in these cases that women who have no vagina are impregnated through the rectum; also, in this malformation, the same result may take place through the urethra.

10. Physiological and Pathological Results from Malformations of the Uterus.—In all cases where the orifices of the neck are free, and the Fallopian tubes and ovaries are in their proper places and normally constituted, fecundation is possible. The gestation may be normal and continue until term; but the partition in the uterus may be a cause of dystocia.

* See *Progrès médical*, 1887, and *Arch. de Tocologie*, p. 359, 1889, and t. XVII, p. 845, 1890.

† Guéniot, *Soc. de Chirurgie*, May 24, 1882.

Gallard, in 1864, reported a case in St. Anthony's Hospital of a woman who had a cordiform uterus, which was ruptured during labor.

Polaillon, in 1877, maintained that an incomplete division of the uterine cavity may influence the position of the fœtus in the uterus, and, also, the insertion of the placenta. In fact, Polaillon reports a case of a young girl, primipara, eight and a half months pregnant, having a subseptus uterus. There was a shoulder presentation, which necessitated performing version, and a faulty insertion of the placenta, causing considerable hæmorrhage, necessitating the employment of a tampon. The woman died ten hours after the labor.

In another woman, thirty-eight years old, about eight months pregnant, the same surgeon found a trunk presentation. He succeeded in delivering, by performing version by the feet, a large well-formed girl. Some time after the woman died of Addison's disease, and the autopsy showed an incomplete division of the uterus.

Undoubtedly the partitioning of the uterus seems to have some effect upon the presentation of the child during labor, and also upon the insertion of the placenta. This double effect should be remembered by the physician. If the diagnosis has been made previous to labor, it will be well to give a guarded prognosis.

When the uterus, instead of being incompletely partitioned, is divided into two halves, separated by a complete partition, conception may take place in one or the other of these halves, and it is indifferent which cavity, provided it is not rudimentary, as met with in a unicornous uterus. Each half may be impregnated in turn; again, each half may be impregnated at the same time, and each contain a child; either the impregnation took place at the same connection, or it occurred at a different time, more or less distant. The presence of a double uterus, having for each a separate vagina, would scientifically

explain the cases of *superfœtation*. The two vaginas, in these conditions, may each serve as a copulating passage, and each of the two uteri may, in turn, be impregnated, and the two products may follow the regular course of development, each being delivered at a different time, each having reached the physiological period of gestation.

This explains how a woman already pregnant may be a second time impregnated, before her labor of the first impregnation comes off. In regard to admitting that a second impregnation may take place in a uterine cavity already gravid, this is only possible near the time of the first impregnation; for later the uterine cavity, obliterated by the egg which it contains, does not permit the spermatozoids to pass into the Fallopian tube, where fecundation takes place. The case reported of a woman who had, successively, sexual connection with two men of different color, a white and a black man, and who was delivered of twins, one white and one black,—showing their separate origin,—proves nothing against our view. Indeed, there is always a certain period of time between the fecundating connection and the time of fecundation. The spermatozoid may only meet the ovule which it is to fecundate twelve hours, twenty-four hours, even several days after it has been deposited in the vagina, at the time of the sexual connection. During this interval of time, a second connection is indulged in, then the two spermatic fluids are mixed, and two spermatozoids, coming from different sources, may simultaneously fecundate two ovules, at the same time, and twins are the result, which simultaneously develop, although they are engendered by two different fathers.

Again, the different color of the two children, above mentioned, does not positively prove that they were begotten by two different fathers. For if white and white produce white, white and black should produce, not black, but a mulatto.

The question of impregnation is, however, very obscure.

G. Colin has seen a terrier bitch covered by a greyhound, and there were born two greyhounds and two terriers, neither having a trace of mixed breed. Farabeuf, on the contrary, has seen a mare covered, successively, the same day, by a stallion and an ass; the mare gave birth to a filly and a mule.

Regarding fœtuses of different ages that are sometimes met with in the same uterine cavity, and delivered either simultaneously or at different times, it seems that it should be admitted, with Velpeau, that there are cases of twins, one of which has undergone regular development, while the other atrophies and dies.

Harris Ross reports the case of a woman whom he delivered of twins on July 16, 1870, in the middle of the fifth month, and on October 31st of the same year he again delivered the same woman of a child at full term. Between these two labors the woman menstruated three times. There was a double uterus.

This question of superfœtation has, however, only a purely scientific interest. From a medico-legal standpoint it is interesting in regard to the duration of the gestation. According to article 312 of the Civil Code, the minimum is 280 days and maximum 300 days for the filiation of a child not to be contested.

11. Hernias of the Uterus.—In nineteen cases of hernia of the uterus, thirteen were cases of the inguinal variety, five of the right side, seven of the left side. In a case reported by Roux,* the hernia was on both sides, at the same time. The uterus has been found twice in a femoral hernia; once only in an obturator hernia, and three times in an umbilical hernia. Generally the uterus is changed in shape, and its condition modified. Frequently, the hernia is accompanied by the

* Roux (de Lausanne): *Congrès francais de chirurgie*, 5th session, p. 497, 1891.

ovary and Fallopian tube, and in cases where the hernia is in the inguinal sac, the intestine and omentum are often present. Michel, Döring, Lédesma, Rektorzick, and Scanzoni have met with the pregnant uterus in an inguinal hernia sac; Leotaud, Murray, and Hagner, in an umbilical hernia. In the case of Maret and Roux, the hernia was evidently congenital, and seemed to be caused by the shortness of the round ligament. But in ordinary cases it appears that the uterus is influenced by a primary hernia of the ovary, or by the enlargement of the hernia sac, at the expense of the peritoneum of the broad ligament (Cruveilhier).

In these cases the fœtus may die from pressure and abort (Scanzoni's case); strangulation may occur, necessitating immediate surgical interference. When a pregnant uterus is in a hernia, and serious accidents are threatened, *Cæsarian operation* should be immediately performed, followed, probably, by (*Porro's operation*) removal of the uterus and its annexes, if the latter are implicated in the displacement. This operation has been followed by great success (Eisenhart).

SIXTH ARTICLE.

MALFORMATIONS OF THE VAGINA.

The anomalies of the vagina which have a common origin with those of the uterus are: absence, rudimentary development, imperforation, congenital atresia, partitioning and abnormal opening of the passage.

1. Absence, Rudimentary Development, Imperforation of the Vagina.—The *complete absence* of the vagina is very seldom met with.

The following cases are from non-medical writers; we quote them as being of more or less interest:

The first is by Bussy-Rabutin.*

" . . . . Finally, from favor to favor, we came to the last; but Oh, what favor! I found that nature, miserly on this occasion, had absolutely refused to this poor woman—a very pretty woman from Chalons—that which she had given so liberally to most others. At first, however, as I am not very credulous regarding miracles, I imagined that, as usual with women, when having their first sexual connection, it was different from what it was, and that she had perhaps even affected this, in order to make the opening small. At last I thought everything, except that which I found. I suspended my judgment until I was fully enlightened. Indeed, I found that the poor woman did not understand deceit, and from the manner in which she yielded I could not believe

* Bussy-Rabutin: *Mémoires de Roger de Rabutin, comte de Bussy.* New ed. by Lud. Lalanne, t. 1, 1639.

she intentionally made the difficulty. However, I was sorry for the woman, who thought she was made as other women, and I did not venture to undeceive her, for fear of causing her shame. I noticed that every time any one spoke of pregnant women before her, she rejoiced that she had not yet been in that condition, as if it were possible for her to be. This prodigy at first gave me some trouble, but finally I became accustomed to her. I loved her none the less; for the poor woman gave me sincerely all she had."*

Later† Bussy-Rabutin relates a conversation he had with a cousin, Mademoiselle Romorantin:

"'Do you know,' I said to her, 'that my mistress is a monster; you well know,' I added, 'that they say: "What you see of man is not man"; here you may say: what you see of woman is not woman.' 'What is she then?' she asked. 'She is neither man nor woman,' I replied; 'she is neither flesh nor fish: She is a speaking statue.' 'But,' again, said she, 'tell me exactly how everything is.' 'Give attention,' I said, 'Mademoiselle, I must be somewhat careful; at least I will only speak of the outside of the house; since I have never been inside.' She replied, 'I will only ask you to tell me what you know.' 'Well, Mademoiselle,' I said, 'at first you come to a beautiful door-way, with moresques, supported by two columns of white marble; and as you think to enter, you find it is a perspective which has deceived your eyes, and nature has walled up the door, in which she has only left a very small slit for the necessary menu and drippings of the house. I do not know if you have understood me, Mademoiselle?' 'Very well,' she replied, laughing heartily."

The second case is related by Casanova.‡

"The last, named Victoria; pretty as a spirit and mild as a

* Bussy-Rabutin, pages 49–50. † Bussy-Raubtin, pages 51–55.

‡ Jacques Casanova de Seingalt: *Mémoires written by himself*, Brussels, 1876, t. v, p. 49–50.

dove, had the misfortune to be what they called barred, and she was ignorant of her condition.

"Madam R———, who also was ignorant of it, sent her to me for a virgin, and I was of the same belief for two hours; always hoping to reach the end, to conquer the charm, or rather to break open the shell. All was useless. Finally, exhausted and tired, I wished to see what was the trouble. Placing her in position and armed with a candle, I began my inspection. I saw a fleshy membrane, pierced by so small an opening that the head of a large pin could scarcely be passed through it. Victoria wished me to force a passage with my little finger; but I tried in vain to break through the wall, which nature had made impenetrable. I was tempted to cut with a knife the obstruction, and the young girl encouraged me to do it, but I was afraid of hæmorrhage, and so ceased my efforts. Poor Victoria, condemned to die a virgin; unless a surgeon does the same operation for her that was done for Mademóiselle Cheruffini shortly after she had married M. Lepri. I said to her: 'My dear child, thy little god hymen most vigorously defies love to enter in his temple.' But to pacify her, I assured her that a good surgeon could easily make her a perfect woman. The next day I related to Madam R——— the circumstances. She replied, laughing, 'This is a lucky condition for Victoria. It will make her fortune.' Count de Padoue had her operated upon, and upon my return to Spain I found her pregnant."

A third case is a satire on Madam Récamier.

Prosper Mérimée says:

"There is yet something to say about Madam Récamier; but it cannot be said; however, she is an enigma. I cannot reproach her with having no heart, but only of having pretended to have one."*

* Prosper Mérimée: *Lettre a la belle-fille de M. William Senior*, 10 juin, 1882; *Revue des Deux-Mondes*, 15 *août*, p. 755, 1879.

Jules Soury writes:

"But the wonder of wonders, after the supernatural beauty of Madam Récamier, is her immaculate chastity. The case of Madam Récamier is not unheard of. It is not necessary to explain that which is truly very simple."*

Alexandre Dumas (son) calls Madam Récamier "an involuntary vestal."†

Finally, we quote the following malicious and cutting lines from a sonnet:‡

CHATEAUBRIAND ET MADAM RÉCAMIER.

Juliette et René s'aimaient d'amour si tendre
Que Dieu, sans les punir, a pu leur pardonner:
Il n'avait pas voulu que l'une pût donner
Ce que l'autre ne pouvait prendre.

In Fig. 56 there is seen an absence of the vagina, and no trace of the vaginal passage between the bladder and the rectum.

O'Ferral (of Dublin), Gooch and Davies, Boyd, Tyler Smith, Hancock, Amussat, Cormack, Coste, Kluyskens, Debrou, Braid, Watson, Gallard, etc., have met with cases of absence of the vagina.§

In Amussat's case‖ Mademoiselle K———, German, had no trace of a vagina. This surgeon operated, and constructed a vagina; the patient afterwards regularly menstruated.

In rudimentary vaginas there is found a fibrous track, which has the position this passage should normally occupy.

The uterus, in these malformations, may be entirely absent, or reduced to a cord; in other cases it is normal, the ovaries are in position and well formed, but menstruation is wanting.

* Jules Soury: *Portraits des femmes*, pages 319–320, Paris, 1875.

† Alex. Dumas: *Affaire Clémenceau*, p. 103, Paris, 1867.

‡ *Parnasse satyrique du dix-neuvième siècle*, Rome, a l'enseigne des Sept., *Péchés capitaux:* without date, t. 1, p. 31.

§ Fleetwood Churchill: *Maladies des femmes*, p. 133.

‖ Amussat: *Compt. rend. de l'Academie des Sciences*, Nov. 2, 1855, and *Gazette médical*, Dec. 12, 1855.

Exceptionally, there occur periodical pains, at the time of the menstrual ovulation.

FIG. 56.—ABSENCE OF THE UTERUS AND VAGINA.

A, Posterior surface of the bladder which has been turned down in front over the pubis; *B*, ureter of right side; *C*, anterior surface of the rectum; *D*, ligament of the ovary; *E*, broad ligament; *F*, fibrous cord representing the uterus; *G*, rectum; *H*, aorta; *I*, pavilion of the right Fallopian tube; *J*, pavilion of the left Fallopian tube; *R*, right kidney.

Léon Le Fort has reported a case of a woman of this kind, who had excessive pains at each menstrual period, with supplementary hæmorrhages from the eyes, from the skin, or hæmoptysis.

Polaillon has reported a case in which there was complete absence of the vulva.* Generally, however, the vulva is well formed, and the hymen is also present, in cases of absence of the vagina.

M. Charles Jacquemard, interne at the Hôtel-Dieu de Saint-Etienne, has published a curious case of absence of the vagina:†

"C. R., prostitute, age twenty-one years, admitted to the hospital Nov., 1889, in Dr. Cénas's ward. She was sent from the dispensary suffering with mucous patches of the vulva and anus. Besides these lesions, she presented a malformation of the genital organs, of which she was ignorant, and which was not suspected by the frequenters of the house in which she lived.

"Living in the country, she had her first sexual connection when twenty years old. Shortly afterwards she left home to work in a brewery, in the neighborhood, and later to live in a house of prostitution.

"Menstruation began at the age of sixteen years, and since that time it has been regular each month; it causes no pain, but is of very short duration, lasting, at most, a day; more often only a few hours, and the quantity is so small that it scarcely spots her linen. It has not been possible for us to verify her statements in this respect, since she has not menstruated during her stay in the hospital, which has lasted four months. She says a similar interruption of her menstrual flow occurred some time ago, and continued for a year, when it again reappeared.

* Polaillon: *Soc. de Chir.*, 1881.

† Jacquemard: *A Case of Absence of the Vagina* (*la Loire médical*, 15 Septembre, 1890). This work contains quite a complete bibliography of all the reported cases.

"She is of a good figure; the mammæ well developed; also the adipose tissue of the buttocks and thighs. She has a boyish appearance, which makes her seem somewhat peculiar. Her intelligence is weak; she answers questions with difficulty, and with a silly smile always replies 'I do not know.' We endeavored to ascertain if her sexual desires were inclined to men or women. With some hesitation and smiling, she said she preferred men. However, we may mention that she was, one night, surprised *in flagrante delicto* with a woman. Moreover, her mental condition may account for her action; if we admit with Gilson* a relation of cause and effect sufficiently intimate between the anomalies of the genital organs and weakness of the intellect.

"The external genital organs of the patient are normal; the hair quite abundant; the labia majora are a little under the normal size, measuring seven millimetres in thickness, their internal surface distinctly perpendicular to the surface of the vulva; the labia minora are prominent, especially in their middle portion, which abruptly projects; they are pigmented, having numerous granulations on their external surface, and on the greater portion of their internal surface. The pigmentation is also seen on the greater part of the labia majora. The glans clitoris is not visible; its prepuce measures fifteen millimetres in width and sixteen millimetres in length; on its surface are seen a few transverse wrinkles.

"The perineum measures three centimetres in length. The anus is deeply situated.

"The angle formed by the internal surface and the external border of the labia majora is three and one-half centimetres from the genito-crural fold. Immediately behind the point where the internal surface of the labia minora ceases to be pigmented and granular, there is found a cul-de-sac, in which

* Gilson: *Encéphale*, t. v, 1885.

are seen a few prominences analogous to the myrtiform carunculæ. The urethral tubercle is well marked. The region soon contracts, so that it is completely obliterated three centimetres posteriorly to the free border of the labia majora, and one centimetre posterior to the orifice of the urethra. If the labia minora are spread out they form a very distinct funnel-shaped cavity, which presents a few folds at its bottom, that converge towards the centre of the cul-de-sac. This cul-de-sac, after a most careful examination, presented no orifice; it is flexible, extensible, and may be depressed, so as to measure nine centimetres in depth from the free border of the labia majora.

"There is with this patient a complete absence of the vagina. The membrane which limits the vestibule is both flexible and extensible; it could only have been formed by frequently indulging in sexual connection, and it is solely owing to this flexible and extensible cul-de-sac that sexual connection is possible with this woman.

"Having this malformation, it was interesting to ascertain the disposition and location of the internal genital organs; since very often in these conditions malformations, more or less marked, are then present of these organs.

"Dr. Blanc, surgeon to the Hôtel-Dieu, was requested to make an examination of our patient. By palpation of the abdomen with vaginal and rectal touch, there was found, in the left hypochondriacal region, a tumor as large as the fist, resisting, not painful, connected to the wall of the internal iliac fossa, not extending beyond the median line; it seemed to be composed of two tumors united together, one larger than the other. This tumor appears to be connected to the upper part of the vaginal cul-de-sac by a very thin fibrous band. Examination of the right hypochondriacal region shows nothing abnormal. Dr. Blanc's opinion, from his examination, is that the tumor in the abdomen consists of the internal genital

organs, the uterus, and ovaries united together in a single mass. Moreover, the normal size of the ovaries and uterus, not being sufficient of themselves to explain the size of the tumor, Dr. Blanc believes these organs have undergone hypertrophy."

Absence of the vagina is not always complete. At times it is the inferior portion which is wanting, and at other times it is the superior part which is absent. Again, the vagina may be divided into two parts at its middle.

When it is the inferior part of the vagina which is wanting, it is due to an arrest of development of the inferior extremity of the utero-vaginal canal, where the two Müller's ducts from which it is formed unite together. When, on the contrary, it is the superior part that is absent, which occurs most frequently, its cause should be looked for in the elongation of the canal of the vestibule.

When the vagina is divided into two superimposed parts, by the interposition of a more or less thick membrane, it may be explained by the obliteration of the primary vaginal passage, or by an arrest of development in the elongation or descent of the vaginal canal to meet the cul-de-sac of the vestibule.

The diagnosis of this malformation is made by employing the rectal touch in connection with the vesical touch.

The indications for treatment differ in cases where there is a normal uterus, and in those where the uterus is absent or rudimentary.

If the uterus is well developed, there occur, at puberty, the symptoms of a hæmatoma of the uterus (Fig. 57), which necessitates the formation of an artificial vagina, in order to give free drainage to the menstrual fluid.

If the uterus is absent, but the ovaries normally developed, the dysmenorrhœa pains, which are felt at the time of ovulation, may be a sufficient reason for the performance of castration; this operation is recommended by Taufer, Langenbeck, Peaslee, Savage, Kleinwachter, etc.

In the cases where it is only a "sexual infirmity," is the surgeon justified in interfering, when the woman desires the formation of a vagina for the purpose of sexual connection? Le Fort rightly remarks that there are some circumstances where an operation of compliance may become an operation of necessity, and we are decidedly in accord with this eminent surgeon's opinion. Le Fort has operated successfully in a case of this nature, employing electrolysis.*

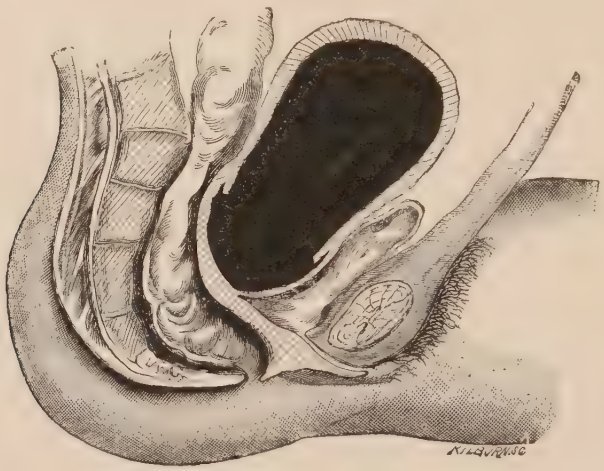

FIG. 57.—ABSENCE OF VAGINA AND RETENTION OF MENSTRUAL BLOOD.

Polaillon,† in 1887, operated on a woman who suffered with a similar malformation (complete absence of the vagina, imperforate neck of the uterus, periodical, painful menstruation). He succeeded in forming an artificial vagina.

F. Houzé, Dolbeau, Richet, Alph, Guérin, Huguier, Amussat, Fletcheven, Zeis, Bernutz, Patry, D. Mollière, Emmet,‡

* Le Fort: *Création d'un vagin artificiel par l'électrolyse* (*Acad. de médecine*, août, 1876).

† Polaillon: *Absence complète du vagin, douleurs menstruelles, création d'un vagin artificiel permettant le coït*, etc. (*Soc. de chirurgie*, 23 mars, 1887).

‡ Emmet: *La Pratique des maladies des femmes*, Paris, 1887.

etc., have performed, partly by cutting and partly by separating the tissues, operations for the formation of a vagina, when this passage was absent. In similar cases, when the uterus is also absent, we can see no reason why the surgeon should refuse to operate. When the recto-vesical partition is thin, the operation may be difficult; however, if the woman is willing, the attempt to make her a vagina should be undertaken, either for the satisfying of the sexual passion, and to retain her husband if she is married, or if she intends to marry, then it is the surgeon's duty to acquiesce.

There are, however, some cases in which a refusal to operate is justifiable; as in the case of the woman mentioned by Gallard,* where it was very evident that marriage was impossible.

But where a woman has contracted marriage, and has only recognized her infirmity when sexual connection was attempted, there should be no hesitation on the part of the surgeon to operate. What would, indeed, become of the unfortunate woman, who, perhaps, is excited by her husband with a passion which he is unable to gratify? For it is not reasonable to suppose that women who are afflicted with this malformation have not the desires and hopes of their sex.

Huguier writes of a malformed woman who was desperately in love with her husband, and disconsolate at the thought that he could give to others the caresses which she was unable to receive, owing to nature's fault. Huguier recognized the impossibility of forming an artificial vagina, and instead he dilated the urethra, in order to permit it to serve as a vagina during sexual connection.

Moreover, it is not astonishing that women with this malformation have the same feelings as women who have a utero-vaginal passage normally formed; since they usually have the essential and characteristic attributes of the female sex.

* Gallard: *Leçons cliniques sur les maladies des femmes*, p. 171.

I have reference to the ovaries, as the following case demonstrates:

Gallard reports the history of a woman who died at fifty years of age, under his care at the Hôpital de la Pitié; she had never menstruated and had been twice married. The vulva was well formed (Fig. 58), the clitoris normal, the prepuce well developed, the Fallopian tubes and ovaries were present, but she had neither vagina nor uterus. Sexual connection was practised, during life, by means of an infundibular passage, four centimetres in depth, which the repeated efforts of the penis had formed, by pushing in the vestibule and vulva.

FIG. 58.—VULVA OF A WOMAN SIXTY YEARS OLD, WHO WAS TWICE MARRIED, ALTHOUGH THERE WAS ABSENCE OF UTERUS AND VAGINA.

It is, therefore, evident that the absence or congenital imperforation of the vagina does not take away from woman any of the attributes of her sex; although it renders her incapable of fulfilling her functions. Fortunately this incapacity is not always irremediable. The patient of Le Fort's is evidence of its relief.

It is better to have resort to the knife than to take the judgment of the courts; as in a case at d'Alais, on January 28, 1873, when a woman who had no vagina was married at the age of twenty-five years. Two years after her marriage her husband asked for a divorce, which was granted.*

It is true that at the present time divorce has been legally

* Tardieu: *Question médico-légale de l'identité* (*Annales d'hygiene publique et de médicine légale*, 2nd série, t. XL, p. 470, 1873.

established. A man who unknowingly marries a woman with this malformation can always, and legally, ask that the marriage contract be annulled with a being who is a woman, but who is able to fulfil neither the duties of a wife nor of a mother.

On the contrary, the absence of the vagina, of the uterus, and of the ovaries in a woman who appears well formed and has the external genital organs normal, has been pointed out by many authors, especially by Griswold, Hunter, Scott, Van Ness, Mackensie, Gouley, Garrigues, etc., as an evidence of the independence of the two genital systems; the internal organs being derived from the internal layer of the blastoderm and the external organs from the cutaneous ectoderm.

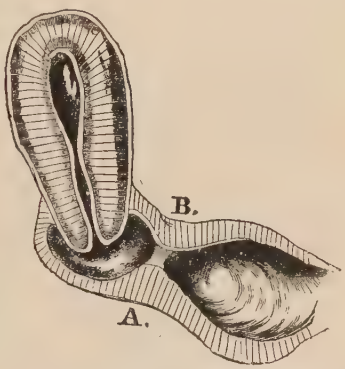

FIG. 59.—OCCLUSION OF THE VAGINA.
A, *B*, Partition which unites the two walls of the canal and divides it into two superimposed cavities.

2. Congenital Atresia (Transverse Bands of the Vagina).—*Congenital stricture* of the vagina, when it is seen as partial adhesions or transverse bands (Fig. 59), is, without doubt, the result of an arrest of development localized in the vaginal part of Müller's ducts, or the result of partial persistence of the temporary union which joins the walls of the vagina, during a given period of fœtal life, as observed by Geigel in a four-month-old fœtus.

The stricture may be so contracted as scarcely to permit the passage of a pocket probe. Méry, F. Barnes, Kyri, etc., have reported curious examples of vaginal stricture; notwithstanding which painful menstruation was present and fecundation took place.

In some cases the vagina is simply narrowed, and the condition is only discovered at the first attempt at sexual connection. Generally, under these circumstances, the tenacity and persistence, on the part of the woman, permit the penis to enlarge the vagina. At other times it is the labor which acts at the dilating force.

Stricture of the vagina is often accompanied by a unicornous uterus, which is probably owing to the utero-vaginal passage, in these conditions, being formed from a single Müller's duct.

Strictures of the vagina by transverse bands are included among a number of cases described as supernumerary hymens. These strictures may have the shape of crescents; of a diaphragm pierced by an opening, varying in size (Fig. 60); they occasion retention of the menstrual fluid, resulting in hæmatoma of the uterus. The hindrance that they may cause to sexual connection, or to labor, often necessitates surgical interference.

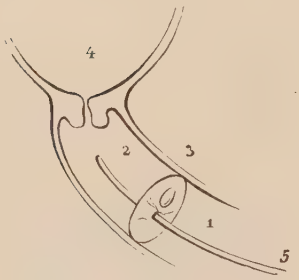

FIG. 60.—STRICTURE OF THE VAGINA.

1, Inferior cavity; 2, superior cavity of the vagina; 3, bladder; 4, uterus; 5, sound passed through the stricture.

Sänger has reported the case of a woman whose vagina was obstructed at its inferior third by a membrane situated four centimetres above the hymen. A small opening was seen in this membrane. The woman was seven months pregnant. Excision of the membrane was performed and the gestation continued to term.

Grevis has published an analogous case, and Matthews-Duncan another, in which the partition was transverse and imperforate.

This anomaly of transverse bands in the vaginas of women is similar to that which exists normally in some animals—the

female Chimpanzee, the Cetacea, the Sheep—in which are found a series of folds of the vagina, resembling superimposed rings. This comparison seems to be well justified, in the cases of women who have two, three and even four separate transverse bands.

3. Partitioned Vagina (Double Vagina). — The longitudinal and antero-posterior division of the vagina is complete (Fig. 61) or incomplete.

Complete division of the vagina coincides with a double uterus and a double hymen. I have reported a case of this kind in which the vagina was truly double.

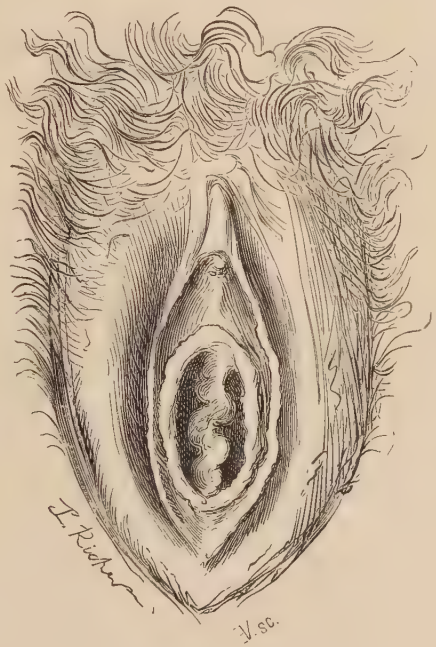

FIG. 61.—DOUBLE VAGINA WITH MEDIAN VERTICAL PARTITION.

Corazza has seen an exceptional case of double vagina with a single uterus.

This malformation is explained by the independent development of the two Müller's ducts, which, instead of fusing to form a single tube, remain separate; in some cases forming an incomplete septum, or even simple bands. The partition which separates the two vaginas, in these malformations, is the result, very probably, of the persistence of the walls of the two Müller's ducts.

As Remy has remarked of a case of incomplete division of the lower two-thirds of the vaginal passage, "When it is remembered that the fusion of the two Müller's ducts begins at the middle of the genital cord, it explains the double vagina with a single uterus."*

The cases of a *bridged hymen*, which Negri has seen four times in one thousand pregnant women, are, probably, only the remains of the partition which primitively divided the utero-vaginal canal.

The existence of a double vagina occasions some special symptoms.

Richet gives the history of a prostitute, a patient in the Hôpital de Lourcine, who by a peculiar moral aberration was able to satisfy her conscience, as to her faithfulness, by reserving one of her vaginas for her most intimate friends.

Partitioning of the vagina does not prevent normal labor, but the partition may, during the labor, be torn and cause a rupture of the vagina; even the uterus may be ruptured, if the tearing of the partition is directed from the vagina towards the uterus. A case of this nature was reported by G. T. Harrison to the Obstetrical Society of New York, in 1888.

Again, this partitioning may cause special symptoms in some affections. Thus, a small vagina, twin brother to a larger one, may conceal the germs of a gonorrhœa, which was thought to have been cured, but later the discharge reappears. This occurs most often in those cases in which one of the vaginas is very much smaller than the other.

De Sinéty has seen three women who had a vertical band placed at the entrance of the vagina.†

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* Remy: *Arch. de Tocologie*, t. XXVI, p. 632, 1889.

† Sinéty: *Brides verticales situées a l'orifice vulvo-vaginal* (*Ann. de Gyn.*, t. XVIII, p. 81, 1882).

Jarjavay, Schröder, and P. Budin* have reported analogous cases.

Is this condition the remains of a biperforated hymen? Is it not rather a case of rudimentary partitioning of the entrance of the utero-vaginal canal in the vestibule?

4. Unilateral Vagina.—In cases of unicornous uterus, it is not unusual to find a vagina situated at the side of the median line.

This anomaly is not very apparent, and the malformation is probably due to the vagina having been formed from a single Müller's duct, the other duct having aborted.

5. Blind Lateral Vagina.—This malformation consists in an incomplete development of one of Müller's ducts, which has formed a semi-vagina, ending in a cul-de-sac at the vulva, while it receives one of the necks of the uterus at the uterine end. In these cases the uterus is always bicornous or double. The malformation is almost always situated on the right side —twenty times in twenty-eight, according to Puech. It is a pocket closely attached to the true vagina, and it is not discovered until puberty, at which time the menstrual fluid flows into the cul-de-sac and forms a hæmatoma, complicated with a uterine hæmatoma. Decès has reported a case of this kind,† which was diagnosed by Nélaton.

6. Abnormal Opening of the Vagina.—The vagina has been seen to open abnormally into the rectum, bladder, urethra, and abdominal walls.

The opening of the vagina into the rectum generally remains unknown to the woman who has the malformation until the

* Budin: *Rech. sur l'hymen et l'orifice vaginal* (*Ann. de Gyn.*, t. XII, p. 375, 1879, and t. XIII, p. 48, 1880).

† Decès: *Bull. de la Soc. Anatomique*, 1854.

time of her first menstruation. It is met with in two varieties: in one, the vulva is normal, but the recto-vaginal partition is incomplete; in the other, the vulva is absent or rudimentary, and the vagina, which is very short, opens directly into the rectum.

This malformation may be explained by an arrest of development of the external genital organs.

All the physiological functions may be performed when this malformation exists, except that menstruation, sexual connection, and even labor are accomplished by means of the anus.

Rossi reports the history of a girl from Piedmont who had married a French corporal. The midwife being unable to deliver the woman, took her to the hospital at Turin. Upon examination an enormous tumor was seen to occupy the position of the vaginal orifice; an incision was made into the tumor and a living child was born. Wishing to ascertain how conception had taken place, the woman, when questioned, said her husband, not being able to find what he searched for, had taken another route. Further examination showed that the vagina opened into the rectum.

Bonnain* and Payne† have reported analogous cases of congenital absence of the *vaginal orifice*, with delivery of the child by the anus.

In Payne's case the woman was well formed and thirty-five years of age. She had been thirty-six hours in labor when first seen by the surgeon, who vainly sought for the vaginal opening. Passing the finger along the perineum, it entered the rectum, where the head of a child was discovered. The woman was very much exhausted by the protracted labor

* Bonnain: *Absence d'anneau vulvaire. Persistance du cloaque dans lequel s'ouvre le col utérin. Accouchement par l'anus* (*Union médical*, 4 sept., 1888).

† Payne: *Cas d'absence congénitale d'ostium vaginæ et accouchement par l'anus* (*Arch. de Tocologie*, t. XIII, p. 854, and *Med. Record*, May, 1886).

and the uterus did not contract. Payne anæsthetized the patient, and, applying the forceps, rapidly delivered the child. There were no complications. Some months afterwards an examination of the woman was made; the vulva was seen to be well formed, having all the appearances of a virgin's vulva. The vagina opened into the rectum. Menstruation had always been regular. Copulation was accomplished by means of the rectum, which satisfied her sexual desires. The woman and her husband were ignorant of her condition.

The opening of the vagina into the urethra and bladder is, perhaps, more seldom met with than the preceding malformation, and coincides more frequently with *absence of the uterus*.

This malformation is only the persistence of a transitory embryonic state: that in which the two united Müller's ducts, by their inferior end, in the genital canal empty into the urogenital sinus, the last becoming the canal of the urethra in the adult female.

In this malformation it is not unusual to find the urethra dilated, and serving as a vagina in sexual connection; but the connection is necessarily unfruitful.

The opening of the vagina through the abdominal walls has only been met with in non-viable monsters. Le Fort has collected a number of cases.

The opening of the vagina into a persisting cloaca has been seen; it is a very rare malformation, and, like the former, only occurs in non-viable monsters.

SEVENTH ARTICLE.

MALFORMATIONS OF THE HYMEN.

Since the investigations of Blandin, in France, and Henle, in Germany, the hymen is considered, as previously mentioned, a simple projection of the inferior extremity of the vagina into the vestibule of the vulva. This theory has been further developed by Budin; but it is, however, denied by some writers, especially by S. Pozzi, also by Hofmann and Las Cassas de Santos, who cite cases of absence of the vagina and the presence of a hymen.

The hymen makes its appearance at the nineteenth week of fœtal life, in the form of a fold, which limits the entrance of the vagina into the vestibule.

In the new-born girl it is seen in the shape of a prominent collar; in the shape of a folded tobacco pouch; but most frequently, as Brouardel remarks, in the shape of lips.*

The size of the opening in the hymen of an infant generally permits the passage of a sound ten millimetres in diameter; in a girl at puberty, the little finger may enter the opening without difficulty. When the thighs are separated, this membrane is tight, but it is relaxed and folded when the thighs are brought together; this should not be forgotten, as it permits the finger to enter without any trouble. Very often the free edge of the hymen presents one, two, or several notches, which should not be mistaken for cicatrices of tears.

The hymen is not always torn in sexual connection, especially

* Brouardel: *Les Causes d'erreurs dans les expertises relatives aux attentats à a pudeur* (*Ann. d'hyg.*, 3me série, t. x, p. 65).

if the woman does not wish it to be done. Budin has seen the hymen intact thirteen times in sixty-five cases of primiparas.

Again, it is to be remembered that in some young girls the vestibule canal is very long; this condition is often hereditary, and the infundibulum is not to be mistaken for that made by the penis above the fourchette in attempts at sexual connection, when the genital passage is still very small.

There are to be described, absence of the hymen, anomalies of location, number, shape, structure, and imperforation.

1. Absence of the Hymen.—The *absence* of the hymen should be very seldom met with, if the experience of Devilliers, Amb. Tardieu, and Brouardel was the rule, since they have never seen this malformation among the many young girls they have examined in connection with medico-legal cases.

Capuron and Toulmouche, however, have each seen the malformation in adults. Dr. Garimond,* in his examinations of all the girls who were delivered by him, found only two in which the hymen was absent.

The first case was an infant born without any complication. Examination showed her to be normally formed, but upon widely separating the thighs and pressing apart the labia majora the opening of the vagina was seen to be of unusual size; it was not noticed whether the myrtiform carunculæ were present or absent.

In the second case, a child five months old, there was an absence of the hymen and also of the myrtiform carunculæ.

These cases occurred in infants who had a single vagina, but when the vagina is double, the absence of the hymen is not infrequent; at least this is the opinion of some anatomists. Joseph Hyrtl says: "When the vagina is double, it is important to know that the hymen is, without exception, absent."

* Garimond: *De l'hymen et de son importance en médicine légale* (*Annales d'hygiène*, 2nd série, t. XLII, p. 380, 1874).

Nothing in the study of development justifies such a positive statement. Indeed, I have seen a young girl with a double vagina and a *double hymen*, which refutes Hyrtl's theory.

2. Variations of the Hymen Depending upon Age.—The location of the hymen varies with the depth of the vestibule of the vulva. In infants it is deeper situated than it is in young girls; also in the Negro race it is placed deeper than it is in Europeans. Krüner reports a case in which the hymen was located two centimetres deep.

3. Double or Biperforation of the Hymen.—One of the most infrequent varieties of the hymen is the *double* or *biperforated.*

In these cases the hymen presents two lateral openings, more or less irregular, separated by a thin band of membrane.

Tardieu,* however, does not believe that this variety is natural; he considers it the result of a tear in the membrane, directed towards its base from the vaginal wall. This view is accepted by Budin.† However, we believe it too exclusive.

Although these cases are very seldom met with, they undoubtedly do occur, as the following cases prove.

Félix Roze‡ has described a case of this kind.

E. Delens, in 1877, reported two cases of biperforated hymen, which distinctly demonstrate that this condition of the membrane is due to a malformation.§

In the first case, a young girl, eleven years old, well grown and in apparent good health, presented an example of a distinctly biperforated hymen. The membrane was smooth,

* Tardieu: *Attentats aux mœurs*, 8th edition, Paris, 1872.

† Budin: *Progrès médical*, 1879.

‡ Roze: *Thèse de Strasbourg*, 1866.

§ E. Delens: *De quelques vices de conformation de l'hymen* (*Annales d'hygiène publique et de médecine légale*, 2nd série, t. XLVII, 1877).

regular, and quite thick, but instead of a single opening there were two small orifices which measured two millimetres in diameter. They were separated from each other by a tongue of tissue, three to four millimetres wide, which did not have the appearance of cicatricial tissue, but resembled the other tissue of the membrane. This tongue of tissue was connected above with the urethral tubercle. The two openings were much nearer the superior and anterior circumference of the hymen than the inferior.

In a sister of this girl, age nine years, the hymen was normal. It had the shape of a crescent; the opening was of such a size that one suspected it had been dilated by the introduction of the finger.

Dr. Delens reports a second case of biperforated hymen: "Catherine B., who was examined November 30, 1876, at the Hôpital de Lourcine, by Dr. Cornil. She had been in the hospital for a month, suffering with a vaginitis. Her brother had accused a young man, eighteen years old, of rape who was arrested under this charge. The young girl said that during a walk in the Bois de Vincennes, a month before entering the hospital, with four young men, the accused had sexual connection with her in the presence of the other three, who had only remained spectators. She did not say, however, that she had been violently treated, and acknowledged that since this time she had had sexual connection with another young man.

"The girl is large and pale and regularly menstruated for a year. She presents no lesion of the lips or mouth, pharynx or any trace of a suspicious eruption on any part of the body.

"The genital organs are fully developed. The pubes and labia majora are covered with long, fine, black hair, but not very thick. The vulva, long, is a little enlarged at its inferior part. The clitoris is slightly above the average size, and upon each side of the prepuce there is found a quantity of sebaceous

matter, due to want of cleanliness. There is not seen any increased redness nor inflammation nor abnormal secretion. The large and small lips are not reddened, neither is the vestibule nor urinary meatus; but the hymen presents a malformation: it is biperforated.

"The openings are oval, with their long diameters directed antero-posteriorly, situated one on each side of the median

Fig. 62.—Hymen with Two Openings Separated by a Bridge of Tissue.

line, and separated from each other by a tongue of tissue which measures four to five millimetres and is continuous above with the tubercle of the urethra. This tissue has not the appearance of a cicatrix; it is supple and has the pink color of the rest of the hymen (Fig. 62).

"The large diameter of each of these openings measures

from seven to eight millimetres, the small diameter from three to four millimetres. The two openings are perfectly symmetrical, and their edges slightly festooned, but not torn. The anterior wall of the vagina forms a well-marked prominence posterior to the hymen; a probe may be easily passed behind the tongue of tissue, which is not adherent to the vaginal wall.

"The glands in the groin are not enlarged, and the anus presents nothing abnormal.

"The uterus was not examined to ascertain if there was any malformation; but it is certain that the inferior part of the vagina did not have any partition corresponding to the median band of the hymen."

In this case the suspected morality of the girl, and the slight violence she seems to have undergone, have very much palliated the situation of the young man accused of rape. However, the importance of this anomaly of the hymen can be understood under other circumstances. The absence of tears does not prove that attempts at penetration had not been violent. They have certainly been repeated, as the girl acknowledges to have had sexual connection with another young man. Yet the evidences of defloration are positively absent.

In this case, however, the hindrance to defloration is not absolute, on account of the great size of the two orifices. Some hymens, with a single opening and of a normal type, are not provided with an opening any larger than one of the openings in this abnormal hymen. The solid median band of tissue which separates the openings in this case was an obstacle, and Delens thinks that Cornil was right to cut it before the girl left the hospital, recovered from her vaginitis.*

* * There is published in the *Journal des connaissances médicales*, Dec. 15, 1876, p. 359, a report of this case and the operation performed by M. Cornil. The microscopic examination of the small tongue of tissue shows it to consist of a central fibro-vascular part, covered with a mucous membrane, having rudimentary papillæ and normal epithelium.

Maljew reports a case of a young girl, nineteen years old, who had an analogous malformation.

Dohrn, in a memoir on the anomalies of development of the hymen,* has described and figured the biperforated hymen.

Dr. Demange, professor of medicine at Nancy, has described the following case:†

"Madame X., aged thirty years, married at twenty-two years of age, widow six years later; never any signs of pregnancy. Wishing to again marry, she was anxious to know if it were possible for her to become pregnant. She complained of slight pains in the lower part of the abdomen, with frequent desire to urinate, and said that micturition was always painful. Menstruation was regular, never suffered with leucorrhœa or any vaginal discharge. Her health is good.

"Examination of the genital organs shows that it is scarcely possible to introduce the end of the finger into the vagina, owing to resistance of the hymen; moreover, the examination is excessively painful.

"Separating the labia majora, it is immediately seen that at the orifice of the urethral canal there exists a small, bright red, vascular tumor, which is only the hypertrophied mucous membrane of the urethra forming a hernia at the urethral orifice, remarkably enlarged. Contact of the finger with this small tumor is excessively painful. The lesion is a vascular polypus of the urethra; well described by Richet, who considers it to be a protrusion of the urethral mucous membrane; a kind of urethral hæmorrhoid.

"On examination of the orifice of the vagina, the hymen is present in all its integrity, but presenting the follow-

* Dohrn: *Zeitschrift für Geburtshülfe und Gynäkologie*, Bd. VI, heft 1, p. 8, 1884.

† Demange: *De l'hymen biperforé, sa valeur médico-légale, sa persistance pendant la grossesse et l'accouchement* (*Ann. d'hyg.*, tome XVII, 2nd série, p. 276, 1887).

ing conditions: It has the appearance of a perfectly regular diaphragm, which occupies the entire opening of the vagina; the opening in the membrane is somewhat elliptical in shape; the larger axis is antero-posterior in direction, and is divided into two orifices by a membranous cord extending from before backwards—antero-posteriorly—in front inserted in the edge of the hymen. It extends to the orifice of the urethra and passes downwards to be attached to the posterior edge of the hymen. This cord is a little flattened and measures about three millimetres in length; its edges are perfectly regular. The free edges of the diaphragmatic hymen are thin, very regular, and present neither tears nor a fringed appearance."

In this case the hymen is formed by a diaphragm, pierced by two absolutely symmetrical elliptical openings; their long axis directed antero-posteriorly, separated from each other by a membranous cord, which is part of the hymen itself. This condition is, therefore, the variety named a *biperforated hymen.* Each opening permits the passage of the end of the little finger, and slight pressure causes excessive pain. The cord which separates the two openings is very resistant.

This examination is very interesting, as it explains how the attempts at sexual connection caused such violent pains and were unfruitful. Sexual connection had never been complete; the membranous band had never been ruptured.

Without doubt, the repeated attempts at sexual connection had produced, through the band of tissue attached to the posterior edge of the urethral opening, the dilatation of the external urinary meatus, and caused the development of the small vascular tumor, at the expense of the urethral mucous membrane. A division of the tongue of tissue transformed the biperforated hymen into a diaphragm with a single orifice, which permits the introduction of the little finger without any difficulty. The small urethral tumor was excised. The following day micturition was painless. Shortly afterwards the woman married, and we recently learned she was pregnant.

From a medico-legal point of view, this malformation of biperforated hymen presents considerable interest. Tardieu and Budin are inclined to believe that this variety of hymen is the result of a tear of a diaphragmatic hymen, in a direction towards its base or the wall of the vagina, following attempts at sexual connection, and they have reported cases in support of this opinion. But from Cornil and Delens' case, and also Demange's case, it may be said that the biperforated hymen is a natural formation. The edges of the opening, perfectly intact, distinctly demonstrate that this condition is not the result of a tear. The presence of a biperforated hymen should not, then, decide that an attempt at sexual connection had been made; but a careful examination of the edges of the orifice should be made, to ascertain if there exists any trace of tears.

This variety of hymen, while it may embarrass sexual connection, is not a positive obstacle to fecundation. A very resistant band of tissue may be a cause of dystocia, as in the following case reported by Dr. E. Demange, through his son, Dr. Chas. Demange:

"I was called to a case of labor, at Neueville, near Nancy, May 28, 1848. The midwife had found some irregularity of the genital organs, which she could not understand. Upon my arrival I found the fœtal head presenting in the first position, and it had begun to exert strong pressure upon the perineum. Examination showed a transverse band of tissue, formed from the hymen, located two centimetres below the bulb of the urethra; it was one centimetre long, and was inserted into the edge of the hymen, which had not been ruptured and was divided into two openings by this band of tissue. One of the openings in the hymen was anterior, the other was posterior. Taking the tongue of tissue between my fingers I felt a strong and decided vascular pulsation, and fearing a rupture, the extent of which I could not anticipate, I placed a double ligature on the band and incised it between the ligatures.

Soon the head entered the vulva and the labor terminated happily."

In the case of Dr. Delens, the resistance made by the tongue of tissue was very decided, and in Dr. Demange's case frequent sexual connection had not ruptured the band, which had remained until the time of labor and prevented the head from entering the vulva.

From the cases we have described, it must be admitted that there are two types of biperforated hymens. In one, the hymeneal tongue is placed antero-posteriorly, with the two openings situated one upon each side; in the other variety, the tongue is transverse and separates the two openings, one being anterior and the other posterior.

4. Anomalies of Shape.—The *anomalies of shape* are the most varied. It has been previously mentioned that the hymen, which is considered normal, may vary in shape. The following, however, are described as malformations:

1. *Fluted hymen*, generally thick and fleshy. This may be considered as the persistence of the infantile type.

2. *Tongue-shaped and keel-shaped hymen.* This is only a variety of the preceding shape (S. Pozzi).

3. *Fimbriated hymen.* This is a very rare variety, and has been well described by Luschka.

4. *Infundibuliform hymen*, inverted like the calyx of a flower. This forms another infantile type.

5. *Partitioned or double hymen.* This is usually met with in cases of double vagina, the *biperforated hymen* previously described.

6. *Cribriform hymen.* In this variety the membrane is seen pierced with a number of small openings.

7. *Columnar hymen.* Here the columns of the vagina, generally only the posterior ones, extend over the lower or inner surface of the membrane.

8. *Imperforated hymen.* This is not to be mistaken for imperforation of the lower extremity of the vagina, which usually remains undiscovered until puberty, when retention of the menstrual fluid takes place and other symptoms occur, which have been described under obliteration of the vagina.

9. *Urethral extension of the hymen.* This is a malformation in which the hymen is prolonged, like a valve, over the urinary meatus; or it may even completely surround the opening to such an extent, in some cases, as to occasion retention of urine in new-born children. Böhmer and N. Tucker have each reported a case of this nature.

10. *Fleshy hymen.*

11. *Sclerosed hymen.* This variety occasions rigidity of the membrane, and at times necessitates the interference of the surgeon in order to permit sexual connection. In some cases this condition may cause a rupture of the perineum during labor, by the obstruction it presents to dilatation of the vulva.

12. *Flaccid hymen.* In this variety the membrane may be so elastic and dilatable that it offers no hindrance to sexual connection, and is only very slightly torn during labor.

13. *Vascular hymen.* With this variety there may occur serious hæmorrhage at the time of defloration. A. Reverdin (1883), Winckel (1886), and L. Aschen (1889) have reported fatal cases of hæmorrhage from rupture of a vascular hymen.

This last variety is difficult of explanation, according to S. Pozzi, if it is admitted that the hymeneal membrane is only a fold of the inferior extremity of the vagina; however, if it is considered as the vestige of the *spongy body* which has remained embryonic, and may exceptionally in woman present erectile tissue like the spongy body in man (see page 57), then this condition is readily understood.

The theory of Pozzi is not accepted by all, and the following case is cited to prove the contrary:

Jeannel has reported a case in which a woman, twenty-six years old, presented the clitoris as large as the penis of a child five or six years old; the male frænum of the vestibule of Pozzi extended from the inferior surface of the glans to the circumference of the urinary meatus, *but no further;* posterior to the meatus is found the entrance of the vagina, surrounded by the myrtiform carunculæ. In this case, therefore, the male frænum of the vestibule seems to be entirely separate and distinct from the hymen.*

S. Pozzi has reported some cases in which there was a hymen in men with hypospadias, but they have not made me change my opinion.

5. Persistence of the Hymen after Sexual Connection.—Matthews Duncan (1882), P. Fabre (1882), A. Wath (1884), Segond (1885), Ozieski (1886), Esipoff (1886), Hugh Taylor (1888), Van de Mey (1889), Gaillard Thomas, Leopold, etc., have mentioned the persistence of the hymen after sexual connection, even until the moment of labor, or retention of the menstrual fluid in consequence of its imperforation.

In Esipoff's case† the urethra was torn during the attempt at sexual connection; an hæmatocele was present, and upon incision there escaped two litres of menstrual fluid, thick as tar, not fetid, and chocolate-colored.

Frequently in these cases there is produced, from the repeated attempts at sexual connection, an infundibular dilatation, and the hymen is pushed back without being ruptured.

The following remarkable case is reported by Marc:

"A girl twelve years old, in whom the signs of puberty were scarcely evident, contracted a liaison with a boy a little older than herself. These two children cohabited for several months,

* Jeannel: *Arch. de Tocologie*, t. XIV, p. 932, 1887.

† Esipoff: *Med. Obosr.*, 1886.

when the father of the boy participated in the favors of his son's mistress. This libertinism continued until the girl was affected with large venereal vegetations, and was obliged to enter the hospital. Examined by Dr. Serres and others, the patient presented the vagina extremely dilated; the external genital organs were scarcely recognizable and the hymen was entirely absent. After recovery of the venereal disease, it was found, to our great astonishment, that the girl had all the evidences of virginity, and especially a very decided semilunar shaped hymen. Dr. Fournier-Pescay and myself were appointed a committee by the Medical Society to report upon this case. We found the hymen was evidently depressed, but it had not been destroyed."*

This variety of cases is not often met with, but their occurrence, however, is frequent enough to justify the opinion that the hymen may be momentarily displaced without rupturing, and without being an obstacle to sexual connection. When the latter act is accomplished with violence it should be classed as rape, since the crime is the same whether the hymen is injured or not, and the victim, if she is an adult, is exposed to the usual consequences of sexual connection.

Obstetrical writers report that all the symptoms of pregnancy supervene in this variety of hymeneal membrane. Joulin† and Cazeaux both have described analogous cases.

Dr. Dufour has reported to the Medical Society of Paris the following case:

The patient presented herself in his office and complained of a very disagreeable swelling of the abdomen, which she could not account for. The supposition of pregnancy caused great exclamations, and it was declared impossible. Examination however, demonstrated the sounds of a fœtal heart and the

* Marc: *Dictionnaire de médecine.* Paris, t. xxx, p. 807, 1846.
† Joulin: *Traité des accouchements.* Paris, 1868.

development of the uterus and also the persistence of the hymen, the opening of which scarcely permitted the introduction of the end of the finger. Fecundation had taken place, notwithstanding the unfavorable condition, and notwithstanding the hymeneal membrane had remained intact. Later information confirmed the diagnosis, and also that sexual connection, which was wholly external, had caused the pregnancy.*

If, then, the hymen is usually ruptured during sexual connection, exceptionally it may yield without rupture, to the act, and the consequences are the same as if the membrane had been torn; and when violence has been employed to further the act, it should be considered as a case of rape.

6. Imperforation of the Hymen.—The imperforation of the hymen at puberty causes retention of the menstrual fluid, and this retention occasions distention of the hymen (Figs. 63 and 64).

This malformation, unrecognized and not treated, may determine serious disorders, among which are the rupture of the dilated Fallopian tubes and the sudden appearance of a retro-uterine hæmatocele, which may end fatally if not early placed under treatment.

The only suitable treatment for these cases, and it usually ends in recovery, is a crucial incision of the hymeneal membrane, followed by antiseptic injections.†

The following verbal communication was made by Dr. Ledentu to the Surgical Society, in the name of Dr. H. Osiecki, of a case of imperforation of the hymen:‡

* Guérard: *Sur la valeur de l'existence de la membrane hymen comme signe de virginité* (*Ann. d'hyg.*, 2nd série, t. XXXVIII, p. 409, 1872). Bergeret: *Des fraudes dans l'accomplissement des fonctions generatrices*, 13th edition, Paris, 1888.

† B. Barnetche: *Considérations sur l'imperforation de l'hymen*, Thèse de Paris, No. 374, 1889.

‡ H. Osiecki (de Montgeron): *Atrésies et stenoses de l'hymen et du vagin* (*Gazette Gynecologie*, 15 novembre, 1886).

"I was called to Sainte-Menehould, in 1881, by M. B. to attend his daughter, fourteen years old; menstruation had not yet appeared; she was suffering with severe abdominal pains, which a physician, without an examination, had diagnosed as vesical.

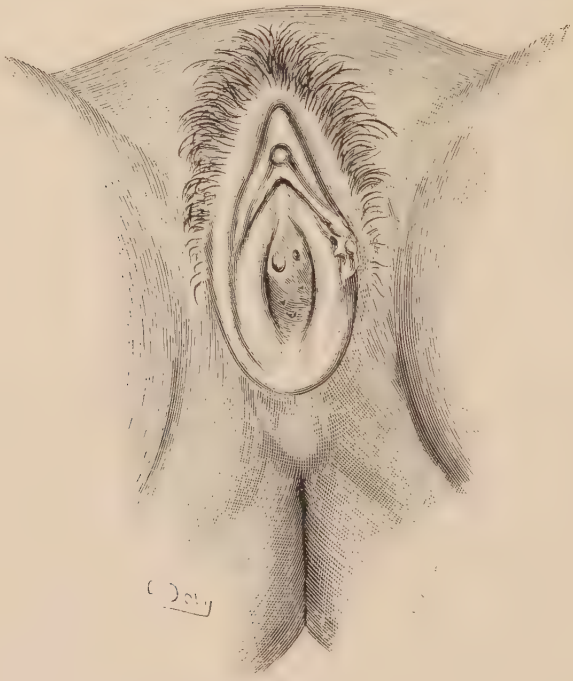


FIG. 63.—IMPERFORATED HYMEN, WHICH HAS DETERMINED RETENTION OF THE MENSTRUAL BLOOD.

"The young girl presented a well-developed chest, the mammæ firm and full. Passing my hand under the bed-clothes, the belly felt enlarged, and the child turned and cried, which at first made me think it was a case of pregnancy, especially as the finger, passed between the labia majora, felt a round, firm body, which seemed about to be delivered.

"Exposing the parts, I found a brownish tumor with an extremely resisting membrane. The bladder was catheterized and imperforation of the hymen diagnosed. An incision of one and a half centimetres was made into the tumor, and 575 grammes of reddish-brown blood removed.

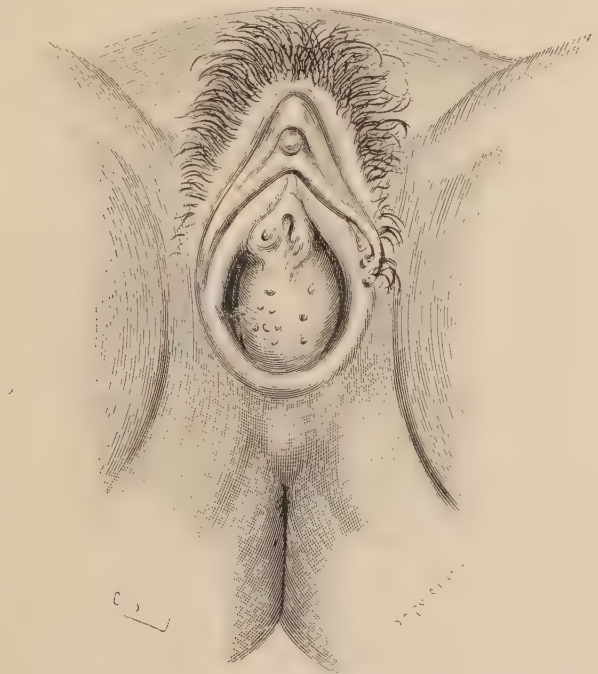


FIG. 64.—IMPERFORATED HYMEN, DISTENDED WITH THE ACCUMULATED MENSTRUAL BLOOD.

"Recovery followed. Menstruation became regular, and a year later I enlarged the opening two centimetres, thinking it would be better for the coming husband."

There have been quite a number of cases of pregnancy with the hymeneal membrane intact. In these cases the delivery of the child is generally made through the natural passage,—

that is, the vulvar ring, after the hymen has been dilated, which is unusual, or more frequently after it has been ruptured. Exceptionally, however, the hymen may resist, and delivery may take place through the ruptured perinuem. Cole* and Madam Slavjanskaja† have reported such cases.

The causes determining this accident are especially the violence of the uterine contractions and insufficient inclination of the pelvis (15°).

With the hymen imperforated, and notwithstanding the pregnancy (it must be admitted, however, that there exists an opening or detachment of the membrane at some point), there is frequently found a dilatation of the urethra.

A very curious case of this nature has been reported by Zinsstag of Bâle,‡ in which the vagina was ruptured by the penis in its unsuccessful attempts to enter the passage.

These cases of pregnancy notwithstanding the hymen remains intact but having a very small orifice, recall a passage from Fabrice d'Aquapendente, which we quote:

"I recollect now a question which was one day asked me, if it were possible for a woman to conceive without connection with a man, and without the penis entering the vulva. The following circumstance was related: A young man and a young girl were much in love with one another, and being alone together they gave themselves to mutual kissing and caressing, which ended in the girl permitting the young man to scarcely touch her vulva with the end of his penis, when during the excitement there was a discharge of semen on the vulva, without the penis having entered the vagina. The girl became pregnant. Both the young man and the girl were

* Cole: *Boston Med. Jour.*, No. 5, 1874.

† Madame Slavjanskaja: *Journal de Tocologie de Saint-Petersbourg*, 12 dec. 1887, and *Jour. d'Obst. et Gynecol.*, pp. 1006 et 1911, 1887.

‡ Zinsstag: *Ein Fall von Conception bei Hymen occlusum* (*Centralb. für Gynäkologie*, p. 219, 1888).

very positive that the penis had not entered the vagina. I replied that in this case conception was possible, because the two young and ardent lovers were in a position, with the glans penis opposite the hymen, to discharge the semen with some force into the vulva, when it was drawn above by the attractive power of the uterus, and conception took place. Platon has assured us that the womb has the faculty of attraction. This story is probably true; but the other by Averroes, in which the semen of a man was discharged in a bath, and later a woman bathing in the same bath became pregnant, is absurd and not to be believed."

In cases of extreme congenital atresia of the vagina, those in which the vagina is partly absent, having only a filiform opening; also those cases in which the hymen is almost completely closed, there is seen on one side a congenital stricture of the vagina, as in E. Ory's case*; and on the other side, a sexual connection followed by a fecundation and a consecutive pregnancy, as in Doleris's case.†

7. Hymen with a Punctiform Opening.—In certain cases the hymen presents a remarkable thickness, and has an opening which is scarcely visible (Figs. 65 and 66), punctiform, almost equal to an imperforation. It is evident that in these cases defloration is rendered almost impossible, as the hymen, which is scarcely perforated, offers a resistance equal to that of a hymen of the same thickness which is imperforated; and in the absence of tears it is not to be concluded that repeated attempts and violence have not been made at sexual connection.

The difficulties which are present in cases of this kind have been well described by E. Delens,‡ in the following case:

* E. Ory: *Arch. de Tocologie*, t. x, p, 118, 1883.

† Doleris: *Arch. de Tocologie*, t. xxiii, p. 135, 1886.

‡ Delens: *De quelques vices de conformation de l'hymen dans rapports avec la médecine légale* (*Ann. d'hyg.*, 2nd. série, tome xlvii, p. 493, 1877).

"Angélina D. arrived in Paris on August 17, 1876, and was met at the railroad station by a woman, to whom she said that she had come to Paris to obtain a situation as child's nurse, but that she did not know how to find work. She stated that she was raised in a small village in Normandy. When seven years old she was placed by the managers of the almshouse in the care of a peasant's family, where she remained

FIG. 65.—HYMEN WITH VERY SMALL OPENINGS.

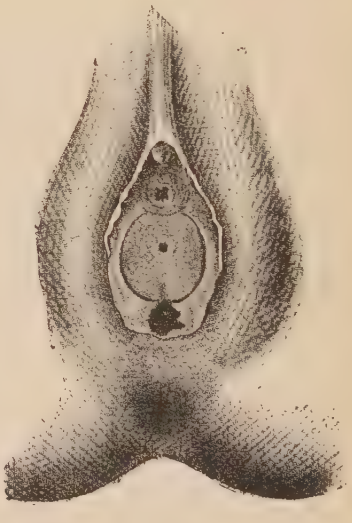


FIG. 66.—HYMEN WITH PUNCTIFORM OPENING; THERE IS ALSO SEEN AN ULCERATION OF THE FOURCHETTE.

until the present time. Her foster-father not wishing to support her any longer, told her she must seek employment, and took her to the railroad station, gave her a ticket to Paris, and a letter, telling her she would meet some one when she arrived in the city who would take charge of her, and if she had any trouble, to show the letter to the station agent.

"Upon reaching Paris the girl found no one to meet her,

and showed the letter to the agent, but the letter contained nothing, and it was evident that her foster-father had only wished to send her away.

"The woman to whom the girl related this story first tried to have her placed in a religious home, but did not succeed; she then placed her with a washerwoman. After a few days her employer noticed that the chemise of the girl was very much stained with greenish spots, and she questioned her concerning the source of this discharge. With hesitation Angélina D. replied that a young man who lived in a neighboring village to her late home had had sexual connection with her; but when asked to give the name and how to find the young man, she would not reply. Finally she said that her foster-father had caused her trouble, and for the past five years had abused her. Frequently, she said, he had connection with her in the fields, and in the barn, and when his wife was absent from home he made her sleep in bed with him; at the same time he threatened to punish her severely if she ever spoke to any one of their relations.

"This story, notwithstanding the contradiction, at first determined her employer to relate it to a magistrate. The information in regard to the girl's childhood, upon investigation, was found to be true; but the serious accusation against her foster-father, was it true? Evidently an examination of the genital organs of the girl, if she had, as she said, been subjected to repeated assaults by her foster-father, would show traces of the acts, and probably the signs of defloration would be present.

"We were charged with the examination on September 24, 1876, and made the following report:

" 'Angélina D. is a girl fifteen and a half years old, large, pale and anæmic, the hair chestnut-brown in color, the eyes brown. Menstruation has not yet made its appearance. Her expression is serious and mild, her manner timid.

" 'There are no lesions of the lips, mouth, or pharynx. The sub-maxillary glands are not enlarged. There are no traces of injuries on the limbs.

" 'The genital organs show the following:

" 'There is no hair on the pubes or labia majora; only a delicate light down is seen on these parts. The vulval fissure is large, lengthened; especially is it enlarged posteriorly, as seen in young fully developed girls. The labia majora are covered with a muco-purulent discharge, and her chemise is covered with yellowish spots. The clitoris is normal, but the internal surface of the labia minora is very red and appears irritated; at the middle of the fossa navicularis is seen a small superficial ulcer, with irregular edges, without any specific characteristics. (Fig. 66.)

" 'The vestibule and urinary meatus do not present any increased redness, but are covered with a muco-purulent discharge.

" 'The hymen is seen as a pink membrane, which at first view appears to completely close the vagina. However, at its centre there is found a small opening, about one millimetre in diameter, through which a small probe may be passed, and by pressure on the perineum a little pus is seen to come from the vagina. The thickness of the membrane is difficult to determine, but it seems to be at least one millimetre, and its resistance appears to be considerable.

" 'Except a slight enlargement of the posterior part of the vulva, there is found no malformation of the genital organs or perineum.

" 'The anus presents no lesion, and the glands in the groin are not larger than normal.' "

Delens's conclusions from the examination are: The girl has a very characteristic vulvitis and vaginitis, accompanied with a muco-purulent discharge, and a slight ulceration of the fourchette. These inflammatory lesions appear to be sub-

acute, they have existed for some time, and he has no hesitation in deciding that they have not spontaneously developed.

Again, the general development of the genital organs of this young girl, notwithstanding the absence of certain signs of puberty, was such as the repeated indulgence in sexual connection would determine, and they also presented the appearance of defloration.

The inflammatory symptoms, the muco-purulent secretion, and the ulceration at the fossa navicularis are enough to confirm the girl's story, and prove that she had had sexual connection with a man, notwithstanding the absence of the usual signs of defloration.

Dr. Delens in his report is not satisfied with only mentioning the absence of defloration, but adds that the peculiar formation of the genital organs renders defloration almost impossible, and that repeated attempts at sexual connection had not ruptured the hymen.

In regard to the malformation of the hymen of Angélina D., will it in the future cause any trouble to the girl? Although menstruation has not yet appeared, it is not probable that there will be any difficulty. The very small opening in the membrane permits now the discharge of pus from the vagina, and will certainly allow the menstrual fluid to flow out when the catamenia is established. In this connection there is a positive difference between this malformation and complete imperforation, which occasions serious results, if it is not discovered before the first menstrual period.

It is evident, however, that sexual connection for this girl is the same as if her hymen were completely imperforated. The opening is so small that dilatation is not possible, and later a simple operation should be made in order to enlarge the orifice.

Cases in which the hymen is perforated but the membrane is not ruptured during sexual connection are due to the resistance offered by the hymen itself; this condition is relatively

not infrequent. Until marriage persistence of the hymen has no inconvenience. But at the time when it becomes an obstacle to sexual connection, it is a troublesome hindrance. Frequently it occasions a violent irritation of the external genitals. It has been the cause of family troubles. Beck, Fleetwood Churchill,* Champion, Emmet, etc., have mentioned rigidity of the hymen. Without doubt in this condition of the hymen the urethra has served as a vagina during sexual connection.

In medico-legal cases the persistence of the hymen and its rigidity have been properly considered. It has been previously mentioned as a cause of sterility, and that after the incision of the hymen the sterility has disappeared. Oldham, among others, has reported cases of this kind.

However, it should not be considered that a resistant hymen is always a cause of sterility. Fodéré reports a case of Fabricius's in which a husband asked for a divorce because he was not able to have complete intercourse with his wife. Upon examination the woman was found pregnant, and an incision removed the hindrance. Depuis, Tucker, Merriman, Davis, Crosse, Fleetwood Churchill, etc., have reported analogous cases.

Ashwell believes that imperforation of the hymen is very frequent in young infants, and Churchill thinks that if this anomaly is less frequent after puberty, it is owing to the parents or the girls having remedied the anomaly before the age when it would cause inconvenience. My examinations, however, of a great number of new-born children do not permit me to agree with Ashwell's opinion.

* Fleetwood Churchill: *Maladies des femmes*, 3d édition, 1881.

EIGHTH ARTICLE.

PATHOGENESIS OF MALFORMATIONS OF THE UTERUS, VAGINA, AND HYMEN.

Before describing the malformations of the vulva, a general study of the origin of malformations of the utero-vaginal canal is here given.

Müller's ducts constitute the whole of the genital canal—Fallopian tubes, uterus, and vagina. The Fallopian tubes come from the upper third of the ducts; the utero-vaginal canal from the inferior two-thirds of the ducts, and the limit of both is regulated by the insertion of Hunter's ligament or the round ligaments. The Fallopian tubes may then be considered as the superior portion of the ununited and divergent Müller's ducts. When the portion included between the insertion of the round ligament and the inferior extremity of the utero-vaginal canal is reduced to a very little or nothing, as is the rule in some animals, the exception in the human species, the body of the uterus is diminished in size or is absent; there is no uterus, only two *uterine cornua*, which serve as a uterus, and open by two distinct orifices into the vagina, as met with in the squirrel, hare, and rabbit. If the insertion of the round ligament is a little high, there is developed a small uterus, as seen in the guinea-pig and rat. If the insertion is still higher, the body of the uterus will be larger (Carnivora, Pachydermata, Ruminantia, Solipeds, etc.), but there still remain the very long uterine cornua. These latter disappear in the monkey tribe, but in the human species the vestiges of them are found normally. Meckel long ago pointed out that the

three months old fœtus has a distinct bicornous uterus. However at this period there are seen the traces of an appreciable part, which will be developed into the body of the uterus, and later absorb the cornua. Therefore, a number of malformations may come from these embryonic states, and reproduce by *revertive anomaly* the several types of the animal species.

In the majority of the Marsupialia, Müller's ducts are not united ; they are separately developed and produce two uteri and two vaginas, which open by two distinct orifices into the vestibule. Again, as in the Halmaturus, the two vaginas, distinctly separate at their middle part, are united in a single duct above and below, which receives at its superior opening the two uterine necks, and at its inferior opening empties into the vagina. Some traces of internal division of the genital canal are found, to a varying extent, in almost all animals, with the exception of monkeys and man. Among many of the rodents, notably the hare, there are seen a double uterus and a double vagina. With others, as the mouse, the partition is only seen in the superior part of the uterus.

These descriptions of comparative anatomy are very interesting in explaining the malformations of the uterus and vagina, equally as much as those of embryology. Teratology indeed restores again ancestral or phylogenic evolution and individual ontogenic evolution.

For a long time malformations were considered to be simple freaks of nature, but to-day they are known to come from natural causes, of which arrest of development is the cornerstone.

In regard to the initial cause, is it simply an arrest of development, or is it a higher cause, atavism, sporadically reproducing, according to S. Pozzi,* in one species the form of another species, by what Darwin terms a phenomenon of reversion? There is no doubt, the philosophical mind does not stop at the

* S. Pozzi, *Traite de Gynecologie*, Paris, 1889.

simple phenomenon of arrest of development, but seeks further for the essential cause of the anomaly, and it is right.

Among the occasional causes, heredity without doubt often plays an important rôle.

Squarey, Hauff, and Phillips have reported a case in which several sisters of the same family had never menstruated, and their three aunts were sterile. The immediate cause, in the great majority of cases, is an arrest in the morphological evolution or organic growth. Certain malformations, however, as the transverse bands in the vagina, seem to be caused by a pathological process of adhesions and unions, during fœtal life.

A knowledge of the development of the utero-vaginal canal in the human species will assist in understanding the accidental arrests of development it may undergo.

From the beginning of the third month of intra-uterine life, the two Müller's ducts are fused together in their entire extent, which Thiersch has named the *genital cord*, except at their inferior extremity. At this time the genital canal does not show any indication of division into uterus and vagina, and all its inferior part is still unrecognizable; its walls are at this part united, as the eyelids are at this same period.*

At the end of three months, Müller's duct is seen in its entire extent; the two Wolffian canals pass along the sides of the duct and empty into the vestibule, posterior to the urethra. This duct, which was before double, becomes a single duct by the progressive disappearance of the entire partition which separated the two canals. This is accomplished by the fifth month; but towards the end of the third month the genital canal begins to be differentiated into the uterus and vagina by the appearance of the neck of the uterus.

* Geigel: *Ueber Variabilitat in der Enwickl. der Geschlectsorgane bei Menschen*, 1883.

The internal surface of the uterus remains corrugated during the whole of the fœtal life; it is traversed by the folds of the arbor vitæ, which appear to extend at this period over the entire organ, but in fact the fundus of the uterus is not yet formed, and these folds remain limited to the part which later becomes the uterine *cervix*. The Fallopian tubes, at first provided with a simple orifice, acquire the fimbriated extremities.

At this period the vulva, of ectodermic formation, lies deep and terminates in an infundibulum, the vestibule, and is now well named the canal of the vestibule. Into this canal open the urethra and the vagina; the entrance to this canal is provided with a membranous fold, the hymen, at the nineteenth week (Dohrn). This membrane becomes prominent in the vestibule about the end of the fifth month.

At birth the uterus does not have the shape it acquires later in life. At this time the neck forms the principal part, the mouth of the uterus is large, and its anterior lip very often extends beyond the posterior lip. This condition, which resembles the snout of a tapir, may become the origin of the exceptional tapiroid variety of the neck in the adult woman.

During the first years of life the uterus participates but little in the general growth of the rest of the body. Its life remains, as it were, latent until puberty, at which period it undergoes development. This growth of the organ is seen especially in the body, which exceeds that of the neck and which it retains during life.

NINTH ARTICLE.

ANOMALIES OF THE VULVA.

The anomalies of the vulva almost always depend upon an arrest in the normal development of the external genital organs.

There will be described atresia, persistence of the cloaca, hypospadias, epispadias, anastomosis of the ureters with the vulva, absence of the vulva, vulva of double pygopagic monsters, absence and uniting of the labia majora and minora, absence, atrophy, and hypertrophy of the clitoris, and several malformations which, alone or joined with other malformations of the internal genital organs, constitute what is called *hermaphrodism.*

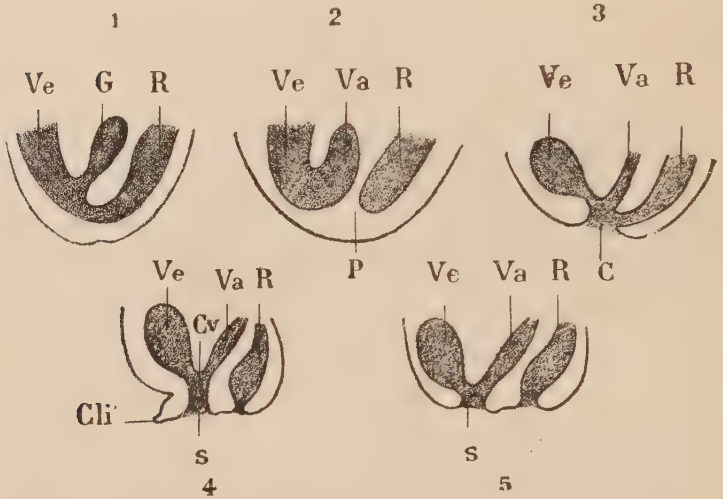
1. Complete Atresia of the Vulva and Urethra.—This condition results from the absence of the genital furrow, which extends in front of the entrance of the uro-genital sinus. There is now no vulvar opening, and whether the bladder, rectum, and genital canal communicate or not, depends upon the existence of the partition in the cloaca (Figs. 67–71).

The urethra not having an external opening, the bladder is enormously distended with urine.

Infants with this malformation are usually non-viable.

2. Persistence of the Cloaca.—When the partition of the cloaca does not exist, it is named ano-vulvar or vestibular and ano-vaginal atresia. In these malformations the rectum opens into the uro-genital sinus, an appendage of the lower part of the allantois or urachus, and which serves as a receptacle for the

rectum, utero-vaginal canal, and urethra. There may also be a simple congenital ano-vaginal fistula (Joseph, Caradec, L. Mayer, P. Reichel, V. Rosthorn), in consequence of an incomplete perineal partition.



FIGS. 67–71.—MALFORMATION OF THE EXTERNAL ORGANS OF WOMAN.—(*Schröder.*)

Fig. 1, Complete atresia of the vulva: *R*, rectum; *Ve*, bladder, and *G*, genital canal communicating between them.

Fig. 2, Complete atresia of the vulva: The allantois, *P*, separates the rectum, *R*; *Ve*, bladder, and the genital canal, *Va*, are distended with urine.

Fig. 3, Ano-vaginal atresia: *C*, the perineum is not formed and the cloaca persists; *R*, bladder; *Va*, vagina; *Ve*, rectum;—all end in this common cloaca.

Fig. 4, Persistence of the uro-genital sinus, *S*, which ends in the urethra, *Cv*, and the vagina, *Va*: *Cli*, clitoris, is hypertrophied. This malformation is easily mistaken for hypospadias in man.

Fig. 5, Hypospadias in woman: The entire allantois is transformed into the bladder; the latter empties directly, without the intermediation of the urethra, into the uro-genital sinus, *S*, that is, the vestibule.

3. Hypospadias.—There are two varieties of hypospadias in woman.

In the first the perineum is normally developed, but the uro-genital sinus retains its embryonic state. The canal of

the vestibule is long and narrow, and the vagina and urethra enter it well above.

This malformation has been wrongly considered as a simple opening, located in the upper portion of the urethra, in a vagina which is contracted at its inferior part.

Hypertrophy of the clitoris frequently accompanies this malformation.

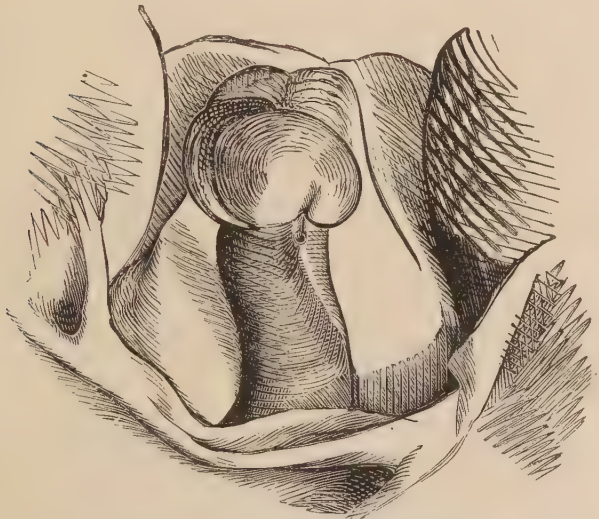


FIG. 72.—HYPOSPADIAS IN MAN.

In the second variety the hypospadias is characterized by the entire absence of the urethral canal. The vagina and neck of the bladder now open together, directly into the vestibule; it appears as if the neck of the bladder opened into the vagina.

This anomaly occurs when the inferior part of the allantois fails to be transformed into the urethra, or when the uro-genital canal has been absorbed in the development of the bladder.

4. Epispadias.—*Epispadias in woman* is very seldom met with. It may or may not accompany exstrophy of the bladder, non-union of the symphysis pubis, imperforation of the anus, and absence of the clitoris or a bifurcated clitoris.

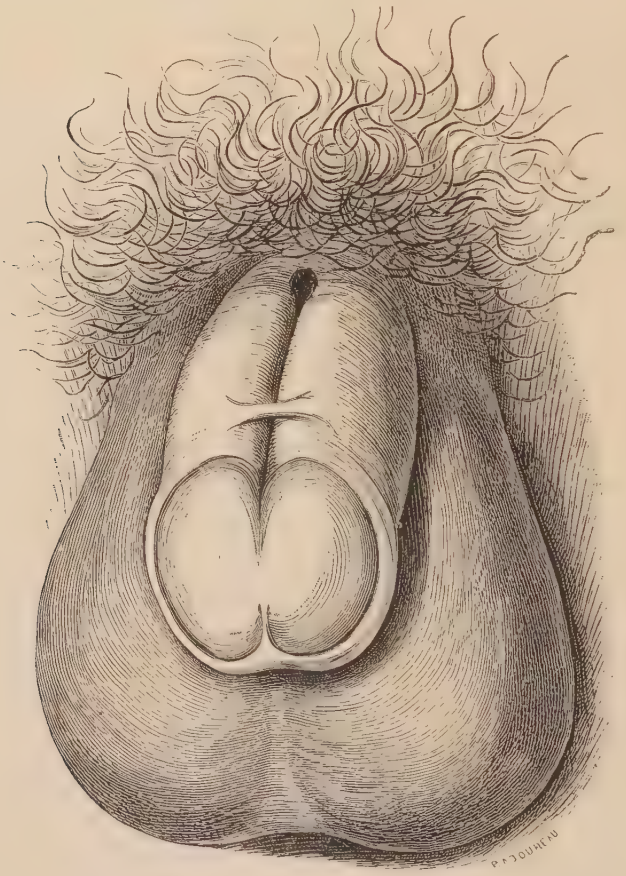


FIG. 73.—COMPLETE EPISPADIAS IN MAN.—(*Dupuytren Museum.*)

Cases of this nature have been reported by Félix Guyon, A. Hergott, Kleinwachter, Emmet, Dohrn, Moricke, R. From-

mel, etc. This malformation certainly seems to depend upon an imperfect disposition of the allantois, which interferes with the development of the bladder and canal of the urethra, or of the urethra alone, and upon the occlusion of the anterior extremity of the vulva (Klebs, Ahlfeld), but the method of its formation is yet under discussion.

In this malformation, instead of the vestibule and meatus, is seen a groove. The clitoris, in a case reported by Nuñez, was absent; generally it is bifurcated. This condition is normal in the Marsupialia and Plagiostomi, as pointed out by Henle and Albrecht ; in the former there are two glans, and in the second two semi-glans. The labia majora are divergent above; each labium minorum is united to half of the bifurcated clitoris. The symphysis pubis is separated or not, and the mucous membrane of the bladder projects as a round swelling above the clitoris.

Incontinence of urine is more or less complete.

5. Anastomosis of the Ureters with the Vagina, Vulva, and Rectum.—The anastomosis of the ureters with the vulva or vagina has been described by Secheyron,* and the anastomosis of these ducts with the rectum has been described by Jeannel.†

Independently of the cases in which the ureters open into the vagina, through the absence of the urethra and neck of the bladder, as in hypospadias, there is met with a deviation of the normal type, in the opening of a ureter at the circumference of the meatus.

Bousquet and J. V. Massari‡ have each reported a case, in which one of the ureters opened into the prepuce of the clitoris; there was also found a division of the vagina. J. T.

*Secheyron: *Arch. de Tocologie*, 1889.
†Jeannel: *Rev. de Chirurgie*, avril, 1887.
‡Massari: *Centralb. f. Chirurgie*, p. 62, 1880.

Winter met with a case in which the ureters opened upon the external surface of the labia majora.*

It is probable, in order to cause this anomaly, that the ureter must have its origin higher than usual in the Wolffian canal; not opening into the bladder it follows the Wolffian canal (Gärtner's canal) in its descent to the uro-genital sinus, in order to open with it into the vestibule of the vulva.

6. Absence of the Vulva.—The absence of the vulva is characterized by the absence of the external genital organs, and the direct anastomosis of the uro-genital sinus at the place where are usually found the vulva and vestibule.

This malformation and the normal development of the internal genital organs have been described by the old writers, but it is very doubtful if such a condition ever exists. In a case reported by Foville, in 1856, it seems, however, that this condition is not impossible; but the anomaly may be described in another manner, that is, to consider it as the result of a uniting of the labia majora.

7. Infantile Vulva.—The infantile state of the vulva is met with among degenerates, who, at the same time, have the utero-vaginal canal in a rudimentary state.

8. Vulva of Double Pygopagic Monsters.—In these double pygopagic monsters—that is, monsters joined together at the gluteal region—it has been demonstrated that these unfortunate beings, united in such an inconvenient manner, were always of the same sex, and almost always females.

Judith-Helene (Fig. 74), incorrectly described by Buffon,† but more accurately described by J. J. Torkos, was a monster

* Winter: *Soc. Obst. and Gyn. Washington,* April 6, 1888.

† Buffon: tome III, p. 50.

of this kind. Millie-Christine, who was seen in Paris in 1868, was also a double monster of this nature.*

J. Geoffroy Saint-Hilaire says that even in its mistakes nature obeys the laws. Double monsters are too symmetrical at the superior part to allow complete fusion at their point of union.

When these monsters live their functions follow the laws of normal organisms. All the positions they take are those assumed by the normal man.

The two female double monsters, Judith-Helene and Millie-Christine, have only one anus, and they both have their faces turned, the sister on the right towards the sister on the left, to the opposite side of the anus, following the law of position in the human species, and even in animals.

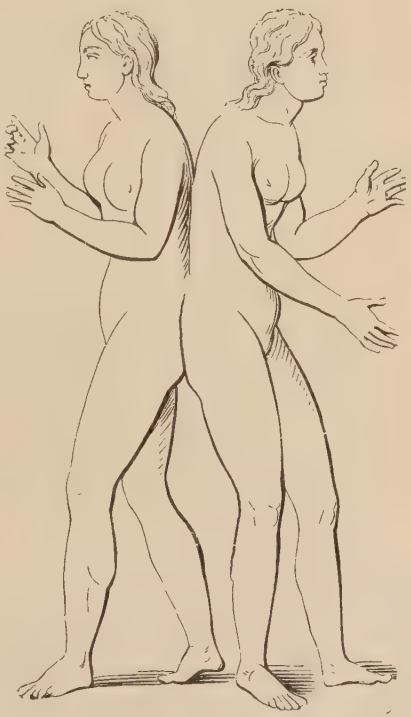


Fig. 74.—Judith-Helene, Twin Girls Joined together at the Posterior Pelvic Region (Adult Pygopagic Bifemale of Geoffroy Saint-Hilaire).

The single anus and the double vulva are evidently established teratological conditions. However, it is not without interest to seek to ascertain the

* For a more detailed description see Tardieu and Laugier: *Contribution a l'histoire des monstruosités considérée au point de vue de la médecine légale* (*Ann. d'hyg.*, 2nd série, t. XLI, p. 340, 1874).

method of development of their anus and vulva, which in a normally formed woman are found in the antero-posterior median line; while in the double monsters they are found in parallel lines.

It may be first said that the union of two fœtuses, back to back, does not take place in the direction of their median lines; there is always a slight inclination to one or the other side. It is this inclination which directs the development. Now, from the side where the transverse axis of each of the pelvises is directed, the anus necessarily should follow the posterior

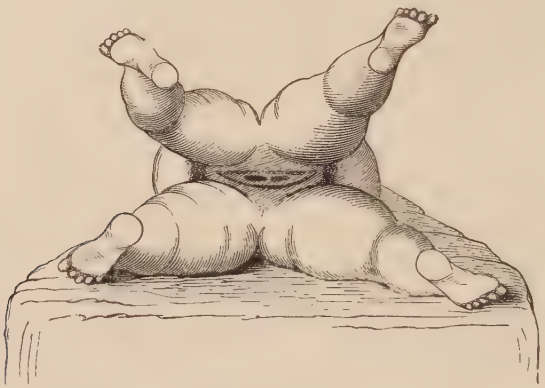


Fig. 75.—Millie-Christine: View of Anus, Double Vulva, and Perineum.

part, and the posterior part of each vulva should join together. Indeed, supposing the union more intimate, it is evident that there would be one cloaca, where would be blended the anus and the two vulvas. But considering that the pelvises are not completely joined in the female double monsters which have been met with, it is now understood how the anuses, fused into one, are found alongside of the two vulvas united end to end, forming a kind of arch, open upon the side opposite to the anus, as seen in Fig. 75.

In Millie the vulva is on her left, in relation to the common anus, which is on her right; in Christine the vulva is on her right, in relation to the common anus, which is on her left. That which may be considered the perineum is a portion of skin, small in extent, seen between the anus and the vaginal partition, which is apparently at the union of the two vulvas.

Dr. Bancroft, who treated Millie-Christine for an abscess of the anus, has described the external genital organs of this monster.

There were found a single anus, and a double vulva with two hymens, separated by a partition as a double vagina.

The double vulva was concealed, as would be expected, since two vulvas united at their posterior extremities could not be long enough to occupy all the inferior floor of the two pelvises.

In Fig. 75 the position of Millie-Christine shows the anus, double vulva, and perineum. The artist has represented the usual abnormal position of the external genital organs of female double monsters.

The other genital parts were normally formed; there were two urethras, two clitorises, and two pairs of labia majora.

Joly and Peyrat have been fortunate enough to have seen a female double pygopagic monster born at Mazères (Ariège), January, 1869. The mother was a primipara and in good health. The labor was somewhat prolonged, but without any complication. It was not possible to ascertain the nature of the presentation, as the child was born when Dr. Peyrat reached the mother; and it is yet more to be regretted that dissection of the monster was not obtained, but they had to be satisfied with photographs. The monster was, essentially, formed the same as Helene-Judith and Millie-Christine. There were two placentas, two distinct umbilicuses, two heads, four arms, four legs (Fig. 76), and it was a female. There was, indeed, nothing abnormal, except the joining together of the

two children at the gluteal region (Fig. 76). One of them, however, was affected with spina bifida, which accounts for its short life (eight to ten hours), while the other lived about twenty hours longer than her sister.

It is stated that with Millie-Christine, when one of the two sisters was given the breast, it satisfied the hunger of the other.

In regard to the genital organs of the double monster of Mazères, they consist of a single vulva, situated near the middle of the axis of union, that is, at the center of a quadrilateral space

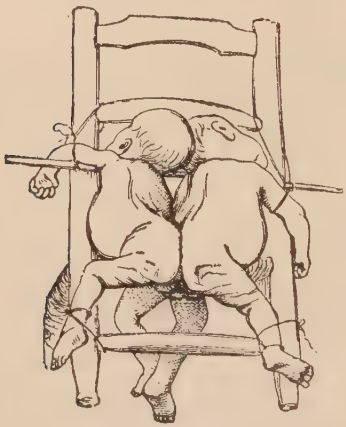


FIG. 76.—THE PYGOPAGIC MONSTER OF MAZÈRES.

FIG. 77.—VIEW OF THE GENITAL ORGANS OF THE PYGOPAGIC MONSTER OF MAZÈRES.

(Fig. 77) formed by the four thighs. This vulva, which is seen when the four thighs are separated at the same time, is composed of the same parts as are found in the normal state; large and small lips, clitoris, urinary meatus, hymen, nothing is absent, not even the mons Veneris.

The vagina is single at its external orifice, but it is bifurcated, as with Helene-Judith, in order to pass to the two distinct and independent uteri, each provided with their ovaries and Fallopian tubes? Of this we are, however, entirely ignorant. The

introduction of a female catheter gave no precise information of the existence of double internal genital organs. A catheter passed through the single urinary meatus entered one bladder and emptied it of urine. It was thought that there was a second bladder, but the catheter did not discover it. The anus was single, as was the vulva, and placed below the latter, between the right thigh of one and the left thigh of the other child. The act of defecation is then simultaneously performed, as was seen by the evacuation of the meconium some hours after birth. If the rectum was single, it was believed, however, that the remainder of the intestine was double.

There were exhibited in Paris in 1891 two girls named Rosa-Josepha, thirteen years old, who were joined together at the posterior part of their pelvis.

Dr. Marcel Baudouin* has made the following report of this monster:

"The reentering angle formed by the body, the point of the V representing the trunks, is constituted by the intimate union of the sacral and coccygeal regions in the centre, and the four buttocks at the lateral parts. There is here seen a saddle-back, of which the bony frame resembles a wooden saddle. There is a single pelvis of exaggerated size, consisting of a double bony frame, that is, four iliac bones, from which the four well-formed inferior members have their origin.

"Below, from the sacral junction between the four buttocks, in the quadrilateral space, and dome-shaped, limited by the part or origin of the four thighs, is seen a region in which Drs. Aug. Breisky and Isch-Wall state that at first view there is seen only single organs: one urethra, one vulva, one anus.

"There is only one urethral orifice from which the urine is seen to flow. The catheter was not introduced, so that the exact condition of the urinary system was not determined.

* M. Baudouin: *Les Sœurs Rosa-Josepha Blazek* (*La Semaine médicale*, 8 juillet, 1891).

It is certain, however, that there are two bladders, since the desire to urinate is not experienced at the same time by both sisters. This same condition is found to exist in other pygopagic monsters, and is due to the circumstance that the two allantois are formed at the time of the union of the embryos, and on account of their extreme anterior position, while posteriorly they are separated for some distance.

"Immediately in front of the urethra is found a single clitoris, upon the antero-posterior median line, from which, upon each side, directed posteriorly, are seen rudimentary labia minora. The whole is surrounded by an almost oval, large elevation or ledge, separating the labia majora and bounding a single vulva.

"Into this single vulva open two vaginal passages, joined one to the other, like a double-barrel gun, but separated by a distinct, complete partition, each vagina having a separate crescent-shaped hymen.

"Between the two vaginas and the single anus, situated a short distance posteriorly, is seen a very slender perineum. The rectum very probably is single for some distance above, since the desire to defecate occurs at the same time for both sisters, but, undoubtedly, there are two large intestines.

"The anus, urethra, and clitoris are located on the same median line, corresponding to the antero-posterior diameter of the arch, which forms the interior surface of the sacral-buttock junction. The two vaginas, on the contrary, are located next to each other in the transverse diameter, that is, perpendicular to the preceding organs. However, upon this point we are not positive.

"This description differs considerably from that describing Millie-Christine, who has two clitorises and a single vagina, and from that of Helene-Judith, who has the vagina at first single, but it soon divides into two passages, and the rectum is double a short distance above the anus."

9. Absence of the Labia Majora and Labia Minora.—Absence of the labia majora has been met with, while the other parts of the genitals are found normal, especially by S. Pozzi. This malformation is the rule in exstrophy of the bladder.

Absence of the labia minora is also met with (Hotman, de Villiers, Auvard, Perchaux). It coincides most often with an imperfect development of the clitoris.

10. Hypertrophy of the Labia Majora and Labia Minora.—Hypertrophy of the labia majora and labia minora is much more frequent than atrophy of these parts, as previously mentioned.

In the case reported by Perchaux,* a girl sixteen years old, there were also found a very rudimentary clitoris and an infantile uterus.

This malformation may take the form of a varicocele (Fig. 78), or even elephantiasis (Fig. 80). Dr. Rigal has reported a very curious case of this kind.†

11. Joining Together of the Labia Majora and Labia Minora.—The union of the large and small lips may take place to a certain extent.

It may cause occlusion of the vulva and make micturition difficult.

Generally, this condition may be relieved by simply separating the vulvar lips with some force.

Debout‡ has reported a case of obliteration of the vulva, which was the result of the union of the labia minora. They formed the inferior wall of a canal the orifice of which opened

* Perchaux: *Arch. de Tocologie*, t. XIII, p. 1886.

† Rigal de Gaillac, in Vidal de Cassis, *Traité de pathologie externe*, 5th edition, Paris, t. V, p. 310, 1861.

‡ Debout: *Cas rares de vices de conformation du vagin guéris par une operation* (*Bull. de thérapeutique*, t. LXV, p. 26, 1864).

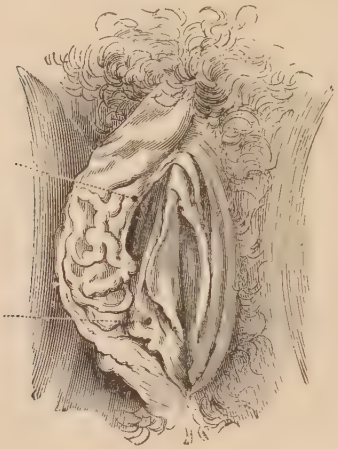


FIG. 78.—VARICOCELE OF THE LABIUM MAJORUM.

FIG. 79.—HYPERTROPHY OF THE LABIA MINORA.

FIG. 80.—ELEPHANTIASIS OF THE LABIA MAJORA.

beneath the clitoris (Fig. 81). The patient was twenty years old when an operation was performed to relieve the malformation.

12. Absence, Atrophy and Hypertrophy of the Clitoris.—Absence of the clitoris coincides with epispadias.

With atrophy of the vulva, there is ordinarily found a rudimentary clitoris.

FIG. 81.—OCCLUSION OF THE VULVA BEFORE OPERATION.

A, Clitoris; *B*, sound introduced into the vulvar opening; *C*, ovary situated in the labium majorum.

FIG. 82.—OCCLUSION OF THE VULVA AFTER OPERATION.

D, Urinary meatus; *I*, opening of the vagina.

Hypertrophy of the clitoris is much more frequently met with (Fig. 83). This malformation occurs with hypospadias and division of the genital canal. In some cases, where there is also apparent occlusion of the external genital parts, it may occasion some hesitation in determining the sex of the individual.

FIG. 83.—ELEPHANTIASIS OF THE LABIUM MAJORUM AND HYPERTROPHY OF THE CLITORIS.

TENTH ARTICLE.

HERMAPHRODISM.

Hermaphrodism, that is, the uniting together of the genital organs belonging to both sexes, sufficiently developed, and arranged in such a manner that the individual who possesses them is able to fecundate himself, and accomplish all the acts of generation, without intercourse with another individual of his species, has never been met with in the human species nor in any of the Mammifera.

But if physiological hermaphrodism is never met with among the higher Vertebrata, it is none the less true that they all temporarily possess all the rudimentary outlines of the genital organs of both sexes; in a word, the highest mammifer, man himself, is transitorily a hermaphrodite being. This transitory, embryonic hermaphrodism may, in some cases, continue beyond its normal period, and if physiological hermaphrodism has never been seen in the adult, anatomical hermaphrodism has been met with.

In the human species there have been seen some individuals who are neither men nor women, or, if it is preferred, both at the same time; who possess testicles, ovaries, uterus, vagina, and external genital organs, so that it was almost impossible to determine the true sex of the individual.

This question of hermaphrodism we have described in detail,* and will now only cite a few cases of these neuter beings, who live, and, moreover, are no evidence of anything supernatural,

* Ch. Debierre: *l'Hermaphrodisme*, J. B. Bailliere, Paris, 1891.

in order not to omit altogether the malformation of the genital organs which is named *hermaphrodism.*

In a case presented to the Obstetrical Society of New York, on March 1, 1887, there were found in the same individual two testicles, two ovaries, a penis with glans, a vagina, and a uterus with oviducts. This individual had lived as a woman until the age of twenty-seven years, and passed both his urine and his menstrual blood through the penis (?).

A curious case has been reported by Klotz,* which was presented at Billroth's clinic. The external genital organs formed two tumors, covered with a brownish skin; the right tumor was as large as a fist, and the left resembled the half of a scrotum. Between the two tumors was seen a curved and bent penis. Since puberty the tumor on the right side had been the seat of periodical pains, which occurred monthly. Billroth removed this tumor, but the patient died of hæmorrhage following the operation.

At the autopsy it was seen that the type of the body was intermediate between both sexes. The mammæ resembled those of a young girl. On each side of the penis, which was affected with hypospadias, there were found two sacs; one had the appearance of a labium majorum, the other resembled a semi-scrotum. The left scrotum contained a testicle with its epididymis, the whole enveloped in a tunica vaginalis; the right scrotum contained a cystic ovary with Fallopian tube, and a part of a unicornous uterus, the whole enveloped in a large diverticulum of Nuck. The neck of the uterus opened into a small vagina; the latter had at its entrance a hymen and opened into the urethra. The vas-deferens followed the usual course and emptied into the urethra. Therefore the uterus, urethra, and vas-deferens had a common excretory canal, the uro-genital sinus, which emptied into a vestibule provided with labia minora.

*Klotz: *Arch. f. klin. Chir.*, t. XXIV, p. 454, 1880.

The cases of men affected with hypospadias (pseudo-hermaphrodites) who have been classed as women during their entire life are not infrequent, and we have reported many examples.*

S. Pozzi† has reported the history of a man suffering with hypospadias, who for twenty-eight years was considered to be a woman.

Dohrn‡ has published the case of a hermaphrodite who, after six years of married life, consulted a physician on account of the fatigue resulting from performing sexual duties. The husband of this "legitimate sodomite" (excuse the expression) utilized the urethral canal for a vagina.

The double-sexed may then be met with under several circumstances: in consequence of malformations of the genital organs; from an arrest of development in one of their embryonic phases in man, or from an exaggerated development in certain parts in woman. Those of the first category are much more numerous, and it is well known that the great majority of hermaphrodites, which have been reported, were men affected with hypospadias.

To develop a pseudo-hermaphrodite of the male sex it is necessary that the genital folds do not unite together, so that the scrotum resembles a vulva, and the penis is not developed, so that it resembles a clitoris. The testicles may be present either in the scrotum, the inguinal canal or in the abdomen, which proves that this man-woman is in truth a man. However, this man may, in some cases, have some of the organs of a woman, notably a vagina and a uterus, very exceptionally even ovaries, more or less developed (Heppner, Grüber, Obolonsky, Odin).

* Ch. Debierre: *l'Hermaphrodisme*, Paris, 1891.
† Pozzi: *Ann. de Gynécologie*, t. XXI, p. 257, 1884.
‡ Dohrn: *Arch. f. Gynäk.*, p. 225, 1883.

To develop a pseudo-hermaphrodite of the female sex, it is necessary that the genital folds (labia majora) unite at the median line, so as to resemble a scrotum, and that the clitoris is sufficiently developed, so as to resemble a penis. Now if the ovaries descend into the labia majora, the individual will have, externally, all the appearances of a man. However, this woman-man is only a woman.

ELEVENTH ARTICLE.

ANOMALIES OF THE MAMMARY GLAND.

Anomalies of the mammæ may be either a decrease or an increase in the number of these glands. In the first case, one mamma or even both glands are absent; this condition is called *amastia*. In the second case, besides the two normal mammæ, there exist one or several supernumerary mammæ; this condition is called *polymastia*. Finally, there may be present simple *atrophy* or *hypertrophy* of the mammary gland.

1. Amastia.—The absence of both mammæ is extremely rare. Until now it has only been met with in children born with anomalies of a much more serious nature.

The absence of one mammary gland, however, is not so infrequent, since Puech has been able to collect ten cases.* When other anomalies are present the malformation is yet more frequent. In the cases reported by Förster, Froriep, and Ried the thoracic wall was imperfectly formed. In a woman, sixty-four years old, Scanzoni found, in connection with the absence of the left mamma, also absence of the left ovary.

2. Athelia.—*Athelia*, or absence of the nipple, has been met with several times.

With athelia may be considered *shortness*, *umbilication*, and *invagination* of the nipple. These conditions may occasion irremediable difficulty in nursing.

* Puech: *Les mamelles et leurs anomalies*, Paris, 1876.

3. Polymastia.—*Polymastia*, or multiplicity of the mammæ, is, relatively, very frequent. Puech, in 1876, collected seventy-seven cases; Leichtenstern, in 1878, collected ninety-two cases. Depuis, Hamy, Hartung, Quinquaud, Barthe, Engstrom, etc., have reported other cases. According to Mitchell Bruce,* it is seen twice as often in men as in women.

This malformation may be divided into two classes: (1) Nipple without mamma (*polythelia*); (2) mamma without nipple; (3) mamma perfectly formed.

Generally the supernumerary mammæ are very small, rudimentary.

Dr. Charpentier† has described the case of a woman (Fig. 84) who had four nipples—two thoracic, two axillary. The supernumerary nipples were smaller than the normal nipples, although they were perfectly formed, and by pressure they discharged milk, like the normal nipple.

In a woman seen by Tarnier, there were four mammæ; each gland gave as much milk as the other.

In another woman seen by Quinquaud, the milk secreted by the axillary mammæ was found to be not so rich as that secreted by the thoracic mammæ.

Finally, a woman seen by Robert was able to nurse her child from a mammary gland situated upon her thigh.

Supernumerary mammæ are met with very much more often upon the anterior part of the thorax, below the normal mammæ. The axillary, dorsal, vulvar, inguinal, and femoral are much more seldom seen. In the table given by Leichtenstern, there are found ninety-six thoracic, five axillary, two dorsal, one acromial, and one femoral mammary glands.

The number of supernumerary mammæ met with in one

* Mitchell Bruce: *Jour. of Anatomy*, XIII, p. 425, 1879.

† Charpentier: *Traité pratique des accouchements*, 2d édition, tome I, p. 69, 1889.

individual varies very much. Neugebauer, in 1886, reported a case in which there were ten supernumerary glands.

In seeing animals with the abdomen and thorax covered with mammary glands, it is reasonable to suppose that the super-

Fig. 84.—Supplementary Mammæ.

numerary mammæ in woman or man are revertive anomalies in the highest degree. But this should not be carried to an absurd point, and concluded that vulvar, buttock, facial, dorsal, etc., mammæ are of atavistic origin; because it will lead to the belief of an ancestral type covered, literally all over the entire

body, with mammary glands. If the supernumerary thoracic, abdominal, and inguinal mammæ are revertive anomalies, the existence of exceptional mammæ, which are met with upon the thighs or back, may be explained by the fact that the mammary gland is comparable to a sebaceous gland. If *Grande Roussette* has axillary mammæ, *Capromys Fourieri* axillary and femoral mammæ, *Coypou* dorsal mammæ, these are aberrant glands, which occur late in the phylogenic evolution and are transmitted by heredity.

The dorsal and femoral mammæ which are met with in men are purely accidental productions.

4. Atrophy of the Mammæ.—*Atrophy* of the mammary glands is usually acquired, and mastitis of the new-born is a very common cause of this condition. The rudimentary state of the mammæ may, however, be congenital.

This anomaly may occur only on one side, or it may affect both glands. Puech has reported a case of unilateral atrophy. Engstrom* reports two analogous cases. As a rule, atrophy of the mammæ is present when the uterus remains in a fœtal state (Puech); although there are exceptions, since Négrier, Virchow, and Rokitansky have found an infantile uterus with large mammæ. This, however, may be explained by the presence of ovaries.

5. Hypertrophy of the Mammæ.—*Hypertrophy* of the mammary glands may occur in both sexes.

In woman the entire mammæ increase in size, without being affected by a neoplasm, and they may acquire enormous dimensions. They have been seen to measure more than a metre in circumference and weigh more than 30 pounds. Labarraque†

* Engstrom: *Ann. de Gynécologie*, p. 81, 1889.

† Labarraque: *Thèse de Paris*, 1875.

has collected 33 cases, and Benoît and Monteils, Monod, Klippel, Billroth, Barton, Richter, Schussler, and Lihotzky have since reported other cases.

FIG. 85.—HYPERTROPHY OF THE MAMMÆ.

The drawing (Fig. 85) is of a young girl, seventeen years old; the mammæ consisted of two enormous masses, resting upon the thorax and abdomen, which they almost completely covered,

reaching as far as the pubis. The largest part of the left breast measured in circumference 75 centimetres, and the right 72 centimetres. The circumference of their pedicles measured about 50 centimetres. Their weight was estimated to be, for the left breast, 7 kilogrammes, and for the right 6½ kilogrammes. The skin covering these immense mammary glands had undergone no notable change. These mammæ were removed in two operations, by Manec; the patient made a satisfactory recovery.*

This condition is seldom seen before puberty; it rapidly develops and calls for surgical interference. Indeed, it generally coincides with the growth of the mammæ, which takes place at this period of life. It is not a congenital anomaly, but an acquired anomaly, which could not be passed by in silence on account of its close relations to growth.

In man, hypertrophy of the mammæ, or *gynecomastia*, is seldom met with. Puech estimates that it is seen once in 13,000 conscripts. Generally, the hypertrophy affects both glands, and it seldom exceeds in size the breast of a young girl.

For a long time it was believed, and recently Dr. Em. Laurent has advocated the view,† that gynecomastia is effeminate and eunuch-like. Olphan,‡ on the contrary, has endeavored to show that gynecomastia may coexist with absolute integrity of the genital organs. The truth is that gynecomastia may occur—most frequently at puberty—in an individual otherwise well formed and having all the attributes of virility; and it is none the less true that it more often coincides with change in the testicles. Thus, hypertrophy of the mammæ is almost always present in male pseudo-hermaphrodites. Ledentu has

* Manec: *Hypertrophie mammaire énorme* (*Gaz. des Hôpitaux*, p. 45, No. 12, 1859).

† Em. Laurent: *Les Gynécomastes* (*Thèse de Paris*), 1888, and *De l'Hérédité des gynécomastes* (*Ann. d'Hyg.*, 3rd série, tome XXIV, p. 43, 1890).

‡ Olphan: *Thèse de Paris*, 1880.

seen it accompany displacement of the testicle. Degenerates, affected with infantilism and effeminacy, as a rule, are gynecomastes. L. Lereboullet, in 1877,* demonstrated that orchitis following parotitis may occasion hypertrophy of the mammæ, after causing atrophy of the testicle. Surgical or traumatic castration may have the same result. This occurred in two soldiers who had their testicles destroyed by the bursting of a shell. These cases were reported by Martin.†

Atrophy or destruction of the testicle, however, causes enlargement of the mamma only when the lesion of the testicle occurs after puberty. It is probable, for this reason, that the eunuchs of the seraglio, in the Orient, castrated when very young, are not affected with gynecomastia.

Conclusion. –Our general conclusion from the study of the anomalies of the genital organs of woman is that in nature nothing is unusual, and our ignorance alone gives power to the fetich gods and manitous of all times and of all countries.

* Lereboullet: *Gaz. hebdomadaire de médecine et de chirurgie*, p. 533, 1877.
† Martin: *Gaz. hebdomadaire de médecine et de chirurgie*, p. 591, 1877.

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